THE PRIMEVAL WORLD:

A TREATISE

ON THE

RELATIONS OF GEOLOGY TO THEOLOGY.

BY

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"Let no man, upon a weak conceit, of sobriety or an ill-applied moderation, think or maintain that a man can search too far or be too well studied in the book of God's word or the book of God's works—divinity or philosophy; but rather let men endeavour an endless progress or proficiency in both; only let them beware that they apply both to charity and not to arrogance,—to use and not to ostentation; and again that they do not unwisely mingle or confound these learnings together."—Bacon.

PREFACE.

LATE investigations in Geology, have, as is well known, been hastily imagined by some to lead to conclusions at variance with certain portions of the Biblical Narrative. Those who have endeavoured to establish the discrepancy between them, have, for the most part, been adequately informed neither in Geology nor in Theology, and have been equally rash in taking for granted their own conclusions in Geology, and their own interpretations of Scripture. Their arguments, on the other hand, have been very frequently met by many authors, some of whom have indeed displayed more zeal for religion than capacity for scientific study, but others have treated the subject with consummate knowledge alike of Geology and Religion. It seems only necessary to mention the late eloquent work of Hugh Miller, and more especially the "Geology and Scripture" of Dr. J. Pye Smith, to show how much genius and learning have been devoted to the cause of religion in reference to this subject. And indeed so many books have been written on the connexion between Geology and revealed Religion, that some apology seems necessary for

the work which the author now ventures to intrude on the public. All the works alluded to have been almost entirely confined to the consideration of the facts of Geology in their bearing on the Mosaic accounts of the creation and the deluge. But whilst the author has ventured to express his views on these subjects, he has thought that there are important bearings of Geology upon other branches of Theology, not yet sufficiently discussed, and that therefore there may be room for a work treating more generally of the relation of Geology to Theology His first design was to have written a series of 'Geological Lectures' on the plan of Dr. Chalmers' 'Astronomical Lectures;' but as the principles and fundamental facts of Geology are not so well known as those of Astronomy, and as many details and technical terms were unavoidable, he was induced to prefer the form of a treatise.

It will be seen from a perusal of the chapter on the 'Mosaic days' that the author has been unable to think the period arrived, when a satisfactory theory reconciling the Mosaic cosmogony with the facts of Geology, can be very confidently advanced. He believes that our knowledge of Geology, and particularly of what is called the drift period, is not sufficiently complete to admit of the enunciation of any such theory, except as an hypothesis not inconsistent with our present knowledge, but liable to be modified by subsequent observations and discoveries. He has found reason to dissent from several of the opinions advanced by Hugh Miller in his 'Testimony of the Rocks,' perhaps the

most eloquent, but by no means the most valuable work of that great man.

It was only after a very careful examination of the arguments on both sides of the question, that the author came to the conclusion that the deluge of Noah was limited in extent. That it was universal, as regards the human race, he firmly believes, as this is a fact asserted in Scripture, and supported by general tradition; but he sees no evidence for supposing that it extended to those portions of the earth uninhabited by man. The arguments, however, which go to prove that the deluge could only have been local, are not derived chiefly from the science of Geology; and at one time the author thought that in a work dealing with geological topics, this difficult question might with perfect propriety have been omitted; but as it has always been discussed in connexion with Geology, although in truth the connexion is slight, and not at all obvious, such an omission might have been regarded as a serious defect.

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CHAPTER I.

A SKETCH OF MODERN GEOLOGY.

It is a Christian duty to meditate upon the character of God, not only as exhibited in grace and redemption, but also as displayed in creation. God is the Author of nature as well as of revelation. His existence is declared, and His perfections are manifested in the one as well as in the other, and therefore both claim our devout attention and earnest study. The Apostle Paul tells us that the Gentiles, who were not privileged with a written revelation of the Divine will, might, from the contemplation of the works of creation, attain to a knowledge of the perfections of God—His eternal power and godhead. On the one hand, it is described as the character of the righteous, that they delight to contemplate God in His works: "The works of the Lord are great, sought out of all them that have pleasure therein;" whereas, on the other hand, it is represented as the character of the wicked, that "they regard not the works of the Lord, neither consider the operation of His hands." True piety derives much of its enjoyment from the contemplation of the works of God. The good man studies the book of nature as well as the book of revelation, and

regards them both as inspired by God. Wherever he goes, he sees the footprints of his Creator, at whatever he looks, he beholds the marks of His handiwork, and he is never alone, for he finds himself on all sides surrounded with God. He considers the heavens as the work of God's fingers, the moon and the stars as ordained by Him, the landscapes as painted by His pencil, the grassy fields and fruitful vales as enriched from His liberality, and the majestic rivers, the sources of fertility and happiness, as the tokens and evidences of His love. Our blessed Saviour has set us the example of thus contemplating God in His works. His discourses have continual reference to the works of nature; from them He drew the sublimest lessons of piety, and by them He represented the mysteries of His kingdom. He discourses upon the fowls of heaven and the sowing of the seed, and from the lilies of the field He reads us the lesson of confidence in God. "Consider the lilies of the field, how they grow; they toil not, neither do they spin; and yet I say unto you, that even Solomon in all his glory was not arrayed like one of these."

There is a vast variety in the works of God, and ample scope for the tastes and acquirements of each observer. Every branch of science is replete with the evidences of the Divine perfections, and instructive with the lessons of piety. Astronomy unfolds to us the glories of the heavens, and in those countless worlds which it displays reveals the grandeur of God; comparative anatomy exhibits His infinite wisdom in all those numberless and wonderful adaptations of means to ends; zoology teaches us the goodness of the Creator in the capacities for enjoyment of the different animals; and moral philosophy reveals to us the holiness and purity of His character. His perfections also are indelibly engraven upon the rocks; and however

barren of instruction these may appear to the inattentive observer, yet they are in reality inscribed with characters which proclaim that God is good. If the heavens declare the glory of God, the rocks do not less strikingly proclaim His wisdom and benevolence. If astronomy unfolds to us the wonders of creation in the immensity of space, geology displays these wonders in the immensity of time. "The Lord is a great God, and a great King above all gods. In his hand are the deep places of the earth; the strength of hills is his also."

In this chapter we propose giving a sketch of Modern Geology. Of course it is utterly impossible to enter into the minutiæ of the science, or even to point out the manner in which the results have been obtained. This is a subject which already occupies volumes, and which is not nearly exhausted. We merely state the results; and in doing so we shall avoid, as carefully as possible, all technical terms, although the nature of the subject renders it impossible to omit them entirely. The facts which we shall mention, be it remembered, unless the contrary is stated, are not mere theories, or probabilities, or speculations, but absolute certainties, which have been completely demonstrated.

We are accustomed to regard the surface of the earth as being upon the whole permanent. We have always looked upon the same hills, the same valleys, the same fields, the same brooks, and the same rivers; nor can the mind conceive any emblems of stability more impressive than those everlasting mountains, whose vast and imposing outlines remain unchanged from one generation to another. The slightest thought, however, soon corrects these impressions, and teaches us that what we regard as permanent is in reality continually changing. The brooks and rivers are

constantly wearing down the hills, and carrying with them earthy materials to the valleys beneath. Every shower of rain which falls disintegrates a portion of earth, which is carried away by the rill or stream. The waves of the ocean wear away the shore, and undermine the rocks. And we read in other quarters of the world of earthquakes which alter the appearance of a whole district, and of volcanoes which elevate mountains, and spread their contents of lava and ashes over the soil. And these changes are constant; at no time are the causes which produce them at rest; the rivers are continually carrying down earthy materials, and strewing them upon the ocean bed; and the waves are constantly dashing against our coasts, and altering their general outline. All is in a state of change—ceaseless, incessant change. In reality, the existing mountains are gradually becoming less, and the existing oceans are gradually filling up, although many centuries may pass before the change become perceptible. In the remarkable words of Job, so descriptive of these changes: "Surely the mountain falling cometh to nought, and the rock is removed out of his place. The waters wear the stones: thou washest away the things which grow out of the dust of the earth."

Nor are these changes which are constantly taking place so small as we are apt to imagine. During floods every brook and rill assumes a muddy appearance, bearing along with it a large quantity of mud, sand, and small stones into the stream with which it unites; and the streams, likewise charged with mud, flow into a river, which carries a vast amount of matter into the ocean. Now, if this is the case in one small district, how immense must be the quantity of sediment conveyed by rivers over the whole earth. Nay, more, if such is the case with us in a com-

paratively quiet district, what must be the case in those countries where rain falls in torrents, and compared with whose rivers ours are but as streams? The Nile of Egypt,* the Niger of Africa, the Ganges of India, the Yellow River of China, and the still mightier rivers of America, must carry yearly an incalculable amount of matter into the ocean. The Amazon is said to carry down with it such an immense quantity of mud, that it colours the waters of the ocean to the distance of three hundred miles from the shore. The sediment which the Ganges conveys to the Bay of Bengal has been carefully estimated, and is said to be seven hundred thousand cubic feet per hour. This would be, as Sir Charles Lyell remarks, as if nearly sixty great pyramids of Egypt were carried down annually into the sea, the base of that pyramid covering eleven acres, and its perpendicular height being nearly five hundred feet. "It is scarcely possible," adds that author, "to present any picture to the mind which will convey an adequate conception of the mighty scale of this operation, so tranquilly and almost insensibly carried on by the Ganges, as it glides through its alluvial plain, even at the distance of five hundred miles from the sea. It may, however, be stated, that if a fleet of more than eighty Indiamen, each freighted with about one thousand four hundred tons' weight of mud, were to sail down the river every hour of every day and night for four months continuously, they would only transport from the higher country to the sea a mass of solid matter equal to that borne down by the Ganges, even in this part of its course, in the four months of the flood season; or the exertions of a fleet of about two thousand such ships going down daily with the same burden, and

* The Nile is estimated to carry down annually into the sea three thousand millions of cubic feet of detritus.

discharging it into the gulf, would be no more than equivalent to the operations of the great river." In addition to this, it is probable that the Brahmapootra, which empties itself into the same estuary, conveys annually as much solid matter to the Bay of Bengal as the Ganges.*

But we must not merely consider the amount of change which is at present going on upon the earth's surface; we must remember that the same changes have existed and exercised their influence during past ages. The same changes have been going on during the six thousand years since man was created, and, as we will have abundant reason to conclude before this chapter is finished, during thousands upon thousands of years before that event. There never has been a cessation of these influences. There never has been a time when the earth was at rest. Rain, rivers, and the ocean have been continually wearing down the earth, and reducing it to a level. And, on the other hand, opposite agencies have also been at work. Earthquakes and volcanoes have ever exerted an elevating influence, raised land from the ocean bed, elevated mountains, and preserved the inequality of the earth's surface.†

* LYELL'S "*Principles of Geology*," p. 282, ninth edition. This work ought to be read by all who wish to know anything about geology. It is undoubtedly the best book on the principles of geology in this or any other language. Its value is increased by a remarkably perspicuous and fascinating style. It is not merely a standard work on geology, but also in English literature. Perhaps Sir C. Lyell theorises and exercises his ingenuity too much; and, as Professor Sedgwick remarks, it would be desirable were the work stripped even of the semblance of hypothetical assumption.

† Some cities in our own country which were once seaports are now far inland, and others which once existed have disappeared, being sunk below the level of the sea. Some countries, as Scandinavia, it has been demonstrated, are gradually rising, whilst others, as Greenland, are gradually sinking. And thus the dry land and the ocean are changing places.

In the production of these changes there have been two agencies at work—fire and water. These agencies are antagonistic in their effects. Fire, by means of earthquakes and volcanoes, has exerted an elevating influence, and raised land to a higher level; whilst water, in the rivers and the ocean, has exerted a degrading influence, and worn down the earth to a lower level. These agencies have ever been at work during the vast cycles of the geological history of the world, and are the causes of all those mighty revolutions which have taken place upon the surface of the earth.

And now let us advance a step farther. We have considered the changes in operation, let us now see if we can discern their effects in the rocks around us. And, for this purpose, it is only necessary to consider what sandstone, the most common of all our stones, really is. Its very name implies that it is nothing more than sand consolidated into stone. If so, then it must have been water-borne, and water-formed. It must originally have formed the shore, or rather the bed of some primitive ocean. In some sandstones, termed conglomerates, we find many small stones or pebbles embedded; and it is to be remarked, that these small stones are in general rounded, proving the action of water. What, then, are these conglomerates, but the gravel or the beach of some former ocean converted into stone? So, also, what is shale, but consolidated mud? In short, the rocks above mentioned are composed of precisely the same materials as the deposits in our estuaries and seas. Besides, in many of the sandstones we actually find the ripple-mark of the ocean's waves, even as we now see it on our coasts and shores. But what puts the matter beyond debate, is the fossil or organic remains which are sometimes found in these rocks, generally the remains

of some marine shell, animal, or plant, just as shells and fish exist in our present oceans, and as animals and plants are carried into them by our rivers.

There are, however, rocks of an entirely different description, which exhibit no proofs of the action of water, and no traces of organic remains. They are in general shapeless, and not, like the rocks above mentioned, stratified or laid out in layers. Such, for example, are the traps and granites of our mountains. Now, it has been proved that these rocks have been caused by the action of heat, and that they have once been in a state of fusion—that, in short, they are similar to the products of modern volcanoes.*

The difference between these two classes of rocks—the igneous and the aqueous, or as they are commonly called, the stratified and the unstratified, is so marked that it can at once be known by inspection. There have, then, been two great agencies in the formation of rocks—water, the agency employed in the formation of the stratified, as sandstone and shale; and fire, the agency employed in the formation of the unstratified, as trap and granite: the same agencies

* The similarity between these rocks and the volcanic products of modern times, is too close to permit us to doubt that they are both of the same origin. Often the materials are precisely the same: many of the ancient basalts are undistinguishable from the productions of existing volcanoes. When in existing volcanoes the melted matter comes in contact with other rocks, it often changes them and sometimes penetrates into them: so also the stratified rocks in contact with the unstratified exhibit a similar change, as if they had been acted upon by heat, and veins are often seen to intrude themselves. The same phenomenon of dykes or intervening masses of rock is common to the ancient unstratified rocks and the modern volcanic rocks. And as modern volcanic rocks contain no fossils, unless it so happens that the lava has flowed over organic remains; so also is it the case with the unstratified rocks. In all these and in numerous other respects, these unstratified rocks are precisely similar to those which now originate from igneous agencies.

which now exercise, the one a degrading, and the other an elevating influence on the earth's surface. The igneous or unstratified rocks, from being destitute of fossils, will not at present occupy our attention: what we have still to say refers wholly to the aqueous or stratified.

In the stratified rocks—the sandstones, shales, and limestones, there are often found abundant remains of animals —skeletons of creatures which once had life. These organic remains are very numerous, amounting, it is said, to thirty thousand species of plants and animals.* And what is here to be particularly attended to is, that by far the greater number of these fossils are entirely different from the creatures which are now living upon the earth; those few which are the same are chiefly confined to a few shells, and are all found among the uppermost rocks; thus demonstrating that when by far the greater number of these rocks were deposited, the present race of animals had not existed. These fossils, then, are almost all the vestiges of former creations—impressions upon the sands of time which were made ages before man existed—the relics of former worlds.

It is also to be observed, that there are what have been denominated *characteristic fossils;* that is, fossils, or organic remains, which are peculiar to one particular formation, and which are not to be found in any other. For example, there is a class of rocks called the "old red sandstone formation:" now there are certain kinds of fish which are peculiar and confined to it, and which are not to be found in any other rocks either below or above. These fish, then, are the characteristic fossils of the old red sandstone. Now,

* Dr. Hitchcock states that the number of species found in the fossiliferous rocks amounts to thirty thousand. Several years ago, Professor Bronn described twenty-six thousand six hundred and seventy-eight species.

from this fact, it follows that these characteristic fossils, being peculiar to particular strata, discriminate these strata from all others. Thus, then, the discovery of a single characteristic fossil—of a single leaf, or fish, or shell, or tooth, or bone of a reptile is sufficient to determine the geological age of the formation in which it is found.*

Geologists have proved, by careful and extensive inspection, that there is a regular and unvaried order or succession of the different stratified rocks—that there is a series of strata, and that the order in this series is never inverted. Thus, for example, there is a particular rock called the lias, which intervenes in the series between a rock called the oolite above it, and a rock called the triassic below it; now this order is never inverted; the lias is never found above the oolite or below the triassic. It is not meant that the series of formations is to be found complete in any spot of the earth's surface; on the contrary, it is always imperfect, and often some of the intervening members of the series are awanting; but what is meant is, that there is a uniformity of sequence.† Now, this being the case, it is evident that the lowest rock in the series is the oldest or

* "A well-prepared conchological geologist," observes Dr. Pye Smith, "looks to the succession of strata as the possessor of a cabinet does to the order of his shelves; and, with a certainty as precise, knows what species are to be found on every layer."—SMITH's "*Scripture and Geology*," p. 57, Bohn's edition.

† "The arrangement of the various formations may be represented by an alphabetical series from *a* to *z;* and this order, though it is frequently imperfect, is never inverted. We often miss one or more terms in the series, and lose, say the *b*, or *h*, or *m*, or even several letters in succession; but we never find the *b* taking the place of the *a*, or the *d* preceding the *c*, or any member of the series usurping the position of another which ought to go before it; in other terms, we never meet with the entire series of deposits in one place, but those which do occur invariably follow the regular order of sequence."—RICHARDSON's "*Geology*," p. 59, Bohn's Edition.

first formed, and the uppermost rock is the newest or last formed. These rocks are distinguished from each other, not so much by their mineral character, which in many of them is the same, as by the order of succession which may be traced, and by the characteristic fossils which are found embedded in them. Geologists have arranged these different rocks into systems or formations, and to each they have given certain technical names agreed upon. There are at least twelve such formations or systems, each of which has probably taken myriads of years to be formed, and each of which is the sepulchre of a separate creation.*

It is evident that, there being a regular series of stratified rocks, geologists may obtain some proximate knowledge of the depth or thickness of the strata, supposing them all lying the one above the other. This may be done by measuring the thickness of each particular formation, and adding them together. Now, geologists have calculated that the thickness of the fossiliferous rocks is nearly eight miles, and that below them there is a series of aqueous or stratified rocks, which are unfossiliferous, and whose thickness is at least two miles more. It is evident that this thickness cannot be ascertained by direct measurement at any one part of the earth. The highest mountains are not five miles above the level of the sea, and the deepest mines are only half-a-mile below it,—how, then, it may be asked, can it be asserted that the stratified rocks are ten miles in thickness? If, indeed, the rocks had remained as they

* The following is a list of the principal geological formations, beginning at the lowest formation, that is, the oldest or first formed. The Clay slate formation, the Silurian formation, the Old Red Sandstone, the Carboniferous system, the Permian and Triassic formations, the Lias and Oolite, the Wealden, and the Cretacious system, the Tertiary formation, and the Alluvium or present formation. Each of these is again subdivided into groups, and the groups into series.

were originally deposited, the one above the other; if the theory of the old cosmogonists was true, that the earth before the flood was a perfect level surface, "without a wrinkle or a scar,"* it would be impossible to become acquainted with its strata. But this is by no means the case. There are comparatively very few places where the rocks lie in a perfectly horizontal position; they have been raised and displaced by igneous agency, and are now found inclined to one another; and thus, from their inclined position, we are enabled to know far more than could be obtained by a mere examination of the eminences and depressions of the earth; and from this circumstance, geologists have been enabled to conclude that the stratified rocks,—that is, those rocks which were originally sand, mud, or lime, deposited by water,—are at least ten miles in thickness.

In each of these formations there is a separate group or class of organic remains; so that there exists not only a series of stratified rocks, but also a series of separate groups of plants and animals. Not that these groups are entirely distinct, for some few of the organic forms of one formation are sometimes to be found in an adjoining formation; but these forms are comparatively exceptional and few in number, and speaking generally, the organic remains of one formation are of a different type, and are easily distinguished, from the organic remains of another. Thus, then, before man was created, the world has been replenished over and over again by orders of creatures, entirely different from those now living;—during the incalculable ages of the past this earth existed, and then as now beasts trod upon its surface and fish swam in its waters. Such

* The allusion in the text is to Dr. Thomas Burnet's celebrated Theory of the Earth.

are the records of the earth which geology has disclosed to us: its history is engraven upon the stones—the annals of past creations.

And now let us endeavour, if possible, to realize these facts which we have stated. Let us travel in imagination into the distant past. Let us fix our attention upon a small portion of the earth. It is the ocean bed. Fish of peculiar shape are swimming about it; some with fins spread out like wings, and others with huge scales like a coat of armour. In general they are carnivorous, and prey upon their fellows. Ages roll on. These fish have ceased to exist; their remains have been embedded in the mud or sand at the bottom of the ocean; this has been consolidated into stone, and has been gradually elevated until it forms part of the dry land. And now we are led, as it were, into a different world. Gigantic ferns or reeds, like trees, now grow upon the earth. A vegetation has sprung up far ranker and more luxuriant than that which we read of in tropical climes; but not one tree, not one plant is the same as any which now exists.—Ages again roll on. The vegetation has disappeared; the trees have been swept into the ocean, or the ground on which they grew has been submerged; the dry land has again become sea. And in that sea we behold strange shapes and forms—huge reptiles and terrible monsters of the deep: there is one, at least thirty feet long, with a neck longer than that of any swan, a head of a lizard, a body of a crocodile, and the paddles of a whale: there is another, a flying monster, a reptile covered with scales, with wings similar to those of a bat, rivalling in its shape any of the fabulous dragons of antiquity. But their existence also has its limits; the species dies as well as the individual; the age of reptiles has come to its close; and after ages upon ages have passed

away, after another series of elevations and submersions, after this portion of the earth has been sea and land alternately, it is ultimately raised, and peopled with created intelligences, and is the seat of the mightiest empire that ever existed upon earth, and has become the abode of civilization and religion; for this portion of earth, the past history of which we have traced, is a part of the island of Great Britain.

Every formation has, of course, been formed at the bottom of the sea, and is therefore a decisive proof that the district where it is now found once constituted the ocean-bed. It is also a proof that dry land and sea existed contemporaneously, for the materials of which the formation is composed were all originally washed off from the land; and thus in past geological eras, whilst the stratified rocks were deposited, there never was a time when all was land or when all was water. Indeed, every portion of the dry land has, in all probability, been frequently at the bottom of the sea. "By an abundance of various and complicated evidence," says Dr. Pye Smith, "it is proved that there is probably no spot on the face of the earth, both the dry land and the seas as they at present exist, which has not gone repeatedly through the conditions of being alternately the floor of the waters, and an earthy surface exposed to the atmosphere and occupied by appropriate tribes of vegetable and animal creatures."*

But do we reach the limits of terrestrial creation? Are the animals found in the lowest fossiliferous strata the commencement of living beings? This is a point which has not yet been decided by geologists. Some suppose that there may have been creations older than those which the lowest fossiliferous system discloses, but whose remains

* Pye Smith's "*Scripture and Geology*," page 52. Bohn's edition.

have been obliterated by heat. Others again, and those best entitled to our regard and credit, because they have most carefully examined the lowest strata, assert that we have most probably reached the commencement of creation. The lowest formation containing organic remains is termed the Silurian:* below it there are stratified rocks of vast thickness, but which are destitute of fossils: nor is it a just argument to say that in those the remains of fossils may have been obliterated by heat, for some of these inferior strata are unaltered, and are to all appearance quite as well adapted for the preservation of fossils as the Silurian beds above them. So that, in all probability, notwithstanding the opinion of one of the most distinguished living geologists to the contrary,† we have reached the beginning of creation,—the point at which the Almighty Creator called creatures into existence, and animated with living beings the earth which before that period was "without form and void." "In a word," says Sir Roderick Murchison, the distinguished investigator of the Silurian system, "we can now fearlessly assert, that the geological history or sequence of the earliest races of fossil animals is firmly established. Its truth is sustained by the display of forms which mark the period when the first vestiges of life can be discovered, as well as the following successive creations; and thus whilst, with the exception of one sacred record, we can truly say that the origin of the greatest empires of man is buried in fable and superstition, the hard and indelible register, as preserved for our inspection

* We have here adopted the name given by Sir Roderick Murchison. Professor Sedgwick supposes that there is a still lower fossiliferous formation, which he terms the Cambrian; but Sir R. Murchison considers this to be the lowest group of the Silurian. The difference is entirely one of words.

† Sir Charles Lyell.

in the great book of ancient nature, is at length interpreted and read off with clearness and precision."* Professor Sedgwick expresses himself in similar terms: "Have geologists discovered any defined group of strata marking the period when organic life first began? We shall never, I think, be able to give any thing better than a doubtful answer to such a question as this. In the Skiddaw slates are found certain strata with impressions of Fucoids and Graptolites. These are perhaps the oldest fossil beds of the British isles; and below them are other beds of great thickness, not metamorphic, and fit for receiving impressions of organic remains, yet without any traces of animal or vegetable life."†

Long, however, before these creations, the remains of which are found in the rocky strata, were called into being, this world existed, as is evident from the immense thickness of the unfossiliferous strata. Some philosophers suppose that the earth was originally in a state of fusion, that through the course of ages it was gradually cooled, until it was prepared to be the abode of plants and animals, and that from that period this cooling operation has been going on, until it reached such a state as to be fitted for man and the present race of creatures. This, indeed, is a hypothesis, although probable and embraced by some of the greatest of our philosophers, not so well established as those facts which we have mentioned. It is, however, almost certain that there are oceans of fire in the interior of the globe; the lower we descend into the earth the warmer does it become, and at the distance of about fifty miles below the surface the temperature is in all proba-

* Murchison's "*Geology of Russia*," vol. i., page 9.

† Sedgwick's "*Discourse on the Studies of Cambridge University.*"—Preface, page lviii., fifth edition.

bility so hot as to be able to hold granite in a state of fusion.

But geology does not merely inform us of the past conditions of the earth, it also affords us some presages of the future. We have seen the surface of the earth subject to continual changes. Compared with the past duration of the world, many of those mountains, which we speak of as everlasting, are but as yesterday. And these changes are still going on incessantly. A new formation is being formed at the bottom of the sea,—a formation very different from any of those which have hitherto been examined, containing creatures of another order, the remains of man and his works. Vessels have been wrecked and entombed in the ocean, and have been embedded in the sedimentary deposits. And thus, in the course of ages, if the world endure so long, when the ocean bed shall be raised and converted into dry land, the sea will disclose its treasures, and exhibit in a fossil condition the remains of man, and the different plants and animals now existing. These are not conjectures, but what must be inevitably realized, unless some mighty catastrophe, unexampled in the history of the world, shall entirely alter the present state of things.

The Scriptures inform us that there is a catastrophe which shall bring the present economy to a close, but whether it be a total revolution and subversion of natural laws, or only similar to some of those catastrophes which from time to time have taken place in past geological ages, they do not inform us. As the "old world" was formerly destroyed by the agency of water, so the Scriptures inform us the present world will be destroyed by the agency of fire. "The day of the Lord," says St. Peter, "will come as a thief in the night: in the which the heavens shall pass away with a great noise, and the elements shall melt with

fervent heat, the earth also, and the works that are therein shall be burnt up." And the world has within itself these elements of its own destruction.* The volcano and the earthquake are most conclusive proofs that fire rages in the interior; and this fire has only to be allowed free vent, and then the awful catastrophe predicted by the apostle will assuredly take place. I believe that such catastrophes have occurred in past geological ages, and have swept away former creations. And, in modern times, the most awful desolations of particular portions of the earth have taken place by means of fire: the earthquake has swept away thousands of immortal beings, and in a moment of time ushered them into the presence of their Judge: and the volcano has desolated large districts, and converted them into frightful deserts; and God has but to give the word, and the whole world will be shaken from pole to pole, and the imprisoned fire will burst forth, and it may be convert the globe into one vast volcano, and then every vestige of being will be swept from the face of the earth. But there will be no annihilation: from this scene of desolation we believe a new world will spring into existence, fairer than that which has been destroyed, destined, perhaps, to be the abode of still higher orders of creatures, perhaps the residence of redeemed men. "Nevertheless we, according

* "When we consider the combustible nature of the elements of the earth, so far as they are known to us,—the facility with which their compounds may be decomposed, and made to enter into new combinations,—the quantity of heat which they evolve during these processes; when we recollect the expansive power of steam, and that water itself is composed of two gases, which, by their union, produce intense heat; when we call to mind the number of explosive and detonating compounds which have been already discovered; we may be allowed to share the astonishment of Pliny, that a single day should pass without a general conflagration."—LYELL'S "*Principles*," p. 545, 9th edition

to his promise, look for new heavens and a new earth, wherein dwelleth righteousness."

Finally, let us again press upon our readers their duty and high privilege to contemplate the works of God. The book of nature lies open to our inspection, and God has endowed us with faculties and senses to enable us to interpret it. It as well as the written word is a revelation from the God of heaven. We should thirst after the truth in every form, aim simply at it, and not be diverted or turned aside from its pursuit by imaginary inconsistencies. Truth is always one and indivisible: whereas error is manifold, and leads to endless confusion and darkness. But, at the same time, let us remember to consecrate all our acquirements to God. Let the sciences be but the handmaids of religion. God has the entire right to every thing we have; and the more entirely we are devoted to him, the more we infuse a religious spirit into every thing we do, the more do we fulfil the great end of our being. And be assured that the time spent in the pursuit of scientific knowledge, when carried on in a religious spirit, is not lost in its relation to the interests and the pursuits of another world. I believe that one part of the happiness of heaven will consist in examining the works of God,—in exercising those faculties which in the pursuit of knowledge we have exercised upon earth,—in seeing in the great laws which regulate the universe, in the truths of the various sciences, and in the solution of those problems which now engage our attention, new discoveries of God, fresh proofs of His infinite perfections, brighter manifestations of His eternal glory. "Now we see through a glass darkly, but then face to face; now we know in part, but then we shall know even as also we are known."

CHAPTER II.

ANTIQUITY OF THE EARTH AND RECENT ORIGIN OF MAN.

As the science of astronomy has cast a light on several passages of Scripture which were formerly obscure and in general misinterpreted, so geology has rendered a similar service, and in both instances the works of God have illustrated His word. In particular, geology has explained the meaning of certain passages of Scripture relating to the creation, by making known to us the immense antiquity of the world: it has assigned to it an age long anterior to the Adamic creation, and has thus taught us that the time mentioned in the first verse of Genesis, when the heaven and the earth were created, and stated indefinitely as "in the beginning," is in reality separated by long intervening ages from the six days, in which the earth was put into its present form. But geology has not merely illustrated, but also confirmed Scripture: whilst it has taught us the antiquity of the world, it has also revealed to us the recent origin of man; it has demonstrated that the introduction of man into this world could not have been long anterior to the period assigned by Moses—that, in short, man is the most recent of created beings.

These are the two points which we propose to consider in the present chapter, the one as illustrating the scriptural declaration as to the time of the creation of the earth; the other as confirming the scriptural declaration as to the time of the creation of man. In the first place, we shall consi-

der the antiquity of the earth; and, in the second place, the recent origin of man.

I. THE ANTIQUITY OF THE EARTH.

It was formerly a general opinion, and is perhaps still a common notion, arising from an erroneous interpretation of certain passages of Scripture, that the age of the earth is only six thousand years. It has been thought that Scripture teaches us that the world was created out of nothing, during the six days mentioned in the first chapter of Genesis, and that, consequently, it is only a few days older than man. The time described in the first verse as "the beginning," has been understood to be the commencement of the six Mosaic days. Now, with such a supposition geology is entirely at variance. It leads our thoughts far back into the past, and asserts that ages upon ages before man was created this world existed, and was the habitation of living creatures, of beings wholly different from any which now exist—the works of Him, who is "wonderful in counsel, and excellent in working."

It is, however, a difficult matter to exhibit clearly the evidence of the antiquity of the earth which geology affords, not from want of proof, but from a superabundance of it. Each fact adduced must not be considered singly, but in connexion with other points. This evidence may, for the sake of perspicuity, be arranged under two distinct kinds,—that derived from the thickness of the stratified rocks, and that derived from the fossil or organic remains found in these rocks.

1. *The antiquity of the earth is proved from the thickness of the stratified rocks.*

These rocks have been formed by the deposition of sand

mud, or gravel in water: they are of aqueous origin—formed in general at the bottom of the sea. This is evident from an inspection of them: some bear impressed upon them the ripple mark of the waves, and most have marine shells or fish embedded in them. Now similar rocks are forming at present: rivers are carrying down sand, mud, or gravel into the sea, and laying them on the ocean bed, and the waves are continually wearing down the shore; even actual rocks are sometimes, though rarely, formed by means of pressure, heat, or some cementing substance, and these are in all essential particulars the same as the ancient rocks.* Now this being the case, it is evident that if we could calculate the rate at which matter is deposited, either by rivers in their estuary beds, or by the currents of the sea at the bottom of the ocean, we could, by comparing it with the thickness of the stratified rocks, attain to some proximate notion of the time required for the formation of these rocks.

It has been found that this deposition of materials for the production of rocks is in reality a work of extreme slowness; perhaps on an average only a foot in a century, or about sixty feet in thickness during the past six thousand years.† In some places, in the neighbourhood of large and rapid rivers, as the Mississippi, the Amazon, the Yellow river, and the Ganges, the work of deposition has been carried on more rapidly, but even this rapidity, comparatively speaking, is slow. The changes which have taken place within the age of history on

* In Italy, lime is deposited in such quantities from calcareous springs and streams, that in a few years it forms excellent building stone, called travertine.

† "Lakes are ascertained to shoal up in the proportion of only a foot in a century; and oceanic deposits are known to be correspondingly tardy of accumulation."—RICHARDSON'S "*Geology*," p. 52, Bohn's edition.

the earth's surface are comparatively slight,—a few miles added to the dry land in one place, and a few miles taken from it in another; a mountain raised up in one country, and a plain sunk in another; but the general outlines of the earth have not been much altered. The same ocean, without much perceptible difference, has flowed between France and Britain since the days of the Romans; the same rivers have drained our country; and the same mountains have reared their summits. In one view these changes are great, when we consider them as continually carried on throughout the earth; but in another view they are insignificant, when we compare them with the vast thickness of the stratified rocks, and the gigantic changes which have taken place during past geological eras.

Supposing, then, that during the last six thousand years, on an average, one hundred feet of matter in thickness has been deposited, and this is a most liberal allowance, we have next to inquire, What proportion does this bear to the thickness of the stratified rocks? Now this thickness, which may be accurately calculated, owing to the regular series of succession of these rocks, and the inclined positions in which they lie, has been estimated to be no less than ten miles; or, if we take the fossiliferous rocks only into consideration, more than seven miles; so that, in round numbers, not much more than a four-hundredth part of these fossiliferous rocks has been accumulated during the last six thousand years, and this would give us the age of the world to be greatly more than two millions of years.* But this would be a very erroneous estimate of

* Supposing that a hundred feet of matter were deposited during the last six thousand years, then taking the fossiliferous rocks, which are seven miles in thickness, only into consideration, it would take 2,217,600 years for their deposition; but if we take into consideration the whole of

the time required for the deposition of these rocks, for we must not only consider their thickness, but also the changes which have taken place as to the mode of their deposition. The rocks are not all of the same kind, but of a very great variety, thus proving a similar variety in the circumstances under which they were formed. There is a long series of stratified rocks, one succeeding another in regular succession, and each member of the series has been formed under circumstances, as to the amount of dry land and sea, and as to the mode of deposition, entirely different from any which precedes or follows it. Indeed, all means of calculation as to the probable age of these rocks entirely fails us, and we are only enabled to say that it must have been immense. A learned geologist, for example, has calculated, from the rate of deposition at present going on, that it would require six hundred thousand years for the production of a single series of the old red sandstone formation.* And yet what is this compared with the entire mass of the strata? The mind is exhausted in its endeavours to comprehend a duration so immense.

It is also to be observed that the stratified rocks have been formed from other rocks. The mud, sand, or gravel of which they are composed once existed as parts of previously existing rocks, just in the same manner as our present sand and mud consist of the fragments of our rocks, worn down by water and atmospheric agencies.

the stratified rocks, which are ten miles in thickness, this would give us a period of 3,168,000 years.

* M'Culloch's "*System of Geology*," vol. i., pp. 506, 507. The thickness of the strata, in Dr. M'Culloch's example, is more than three thousand feet. A lake, he observes, does not shoal at the rate of half-a-foot a-century; and therefore, taking half-a-foot as an average, this will give us exactly six hundred thousand years for the production of this series of the old red sandstone.

This is true of all the stratified rocks, but it is more clearly seen in the structure of a particular kind of sandstone, termed the *conglomerate*. These conglomerates are composed of a mass of distinct stones cemented together. These stones, then, must have existed before the conglomerate was formed. But not only so, these small stones are rounded, thus proving that they have been acted upon by water, that, in short, a conglomerate is only a beach consolidated into rock. And further, these stones must have been broken off from parent rocks. Thus, then, we have a series of changes: first the parent rocks, from which the small stones were taken, were formed—then these stones were broken from them, and rolled about the sea for ages, until they were rounded—then they settled down in the ocean bed—then, by pressure or some cementing process, they were consolidated into hard rock —and after that, they were raised from the bed of the ocean, and now constitute a part of the dry land.

But perhaps an example of an actual measurement of time, which has been most carefully made, will represent more vividly the immense antiquity of the earth. The example to which we allude is the time taken by the river Niagara to excavate the ravine through which it flows, and which has been so carefully calculated by Sir Charles Lyell. Below the falls, the Niagara flows along a deep ravine, with high precipices on both sides, for seven miles, until it reaches the town of Queenstown, where the level of the country is suddenly lowered. Now geologists have proved that the falls were once at Queenstown, and that the river has since excavated its bed between that and the present position of the falls. The present rate of excavation is estimated to be, at an average, one foot a year, so that, if this rate had been uniform, it would have taken more

than thirty-five thousand years for the retreat of the falls from Queenstown. And although this could not have been the case, although the rate of excavation must have been sometimes slower and sometimes faster, yet it has been estimated that the average of one foot a year would be no exaggeration of the truth. And yet this immense period of thirty-five thousand years is as nothing compared with the age of the world; it does not extend beyond the newest formation, the uppermost tertiary, when the terrestrial shells were the same, or nearly the same, as those now living.* We must add to it all those numerous formations which preceded it, and we will obtain a period, compared with which the time taken for the recession of the Niagara is but a day. "If such events," observes Sir C. Lyell, "can take place, while the zoology of the earth remains almost stationary and unaltered, what ages may not be comprehended in those successive tertiary periods during which the flora and fauna of the globe have been almost entirely changed? Yet how subordinate a place in the long calendar of geological chronology do the successive tertiary periods themselves occupy. How much more enormous a duration must we assign to many antecedent revolutions of the earth and its inhabitants. No analogy can be found in the natural world to the immense scale of these divisions of past time, unless we contemplate

* This has been proved by the discovery of existing forms of shells about four miles below the falls, and nearly three hundred feet above the bottom of the present gorge. "The identity of the fossil species," observes Sir C. Lyell, "with the recent is unquestionable, and these fresh water deposits occur at the edge of the cliffs bounding the ravine, so that they prove the former extension of an elevated shallow valley, four miles below the falls, a distinct prolongation of that now occupied by the Niagara, in the elevated region intervening between Lake Erie and the falls."—LYELL's "*Principles*," p. 218, ninth edition.

the celestial spaces which have been measured by the astronomer."*

2. But secondly, perhaps a more striking proof of the antiquity of the earth is derived *from the fossil or organic remains which are found in the stratified rocks.*

In these rocks there are found embedded the remains of plants and animals, which in past geological ages existed upon this earth. Upwards of thirty thousand different species have been found in the rocky strata, and only a very few of these are the same as the present creation. By far the greater number are of an entirely different order from any which now exist: they are the relics of past creations which have long since disappeared. And it is to be observed, that these creations follow one another in a regular series. The fossil remains are not distributed throughout the strata at random, but in a regular order; each formation has its own peculiar organic remains,—a creation belonging only to itself; thus demonstrating that one creation after another has occupied the surface of the earth: not merely has the individual died, but the entire species has become extinct. Now, however short the life of the individual may be, it is very different with that of the species. The age of the individual may be reckoned by years or by days, but that of the species can only be counted by thousands of years. Since the present race of animals and plants were created, only two or three species are known to have become extinct,† during the last six

* Lyell's "*Travels in South America*," vol. 1, chap. ii. The subject is also treated at considerable length in his "Principles," pp. 214-218, ninth edition. To these the reader is referred for information on this, perhaps, the most accurate measurement of geological time which has been made. It is impossible to condense in a few paragraphs his reasonings, as his own style is at once so perspicuous and concise.

† The Dodo of the Mauritius and the Moa of New Zealand, are well known instances of species which have become extinct.

thousand years: but the rocky strata have disclosed to us nearly thirty thousand species which have perished, and not only so, but one succession after another of different creations. Even the difference of a very few feet of stratified rocks exhibits a change in the forms of animal life; some of the former species have died away and new species have been introduced; thus exhibiting a change greater than has been effected during the last six thousand years.

And, further still, there is abundant evidence from the fossil remains and the nature of the strata, that there must have been frequent alternations of sea and land. A formation containing fossils of marine origin is often succeeded by one containing only the remains of land animals and plants. Thus, for example, there is a particular formation, situated in the south-east of England, termed the Wealden. It has been proved, from the nature of its fossils, to be a fresh water formation; perhaps formed by the deposition of earthy materials at the mouth of some immense river, or by the filling up of some gigantic lake. But both above and below it are marine formations, as is distinctly proved from the fossils which they contain. Thus, then, there is here a series of alternations of sea and land: first there is a sea, then the bed of the sea becomes dry land during the deposition of the Wealden, afterwards the land is depressed and again converted into sea, and lastly it is elevated a second time, and is converted into the land which now exists. Similar alternations of sea and land are clearly discernible in the other formations. Thus, during the deposition of the tertiary or newest system, it has been proved that large portions of the earth have thus changed several times. In short, it has been demonstrated that every portion of the earth's surface, unless possibly

the tops of some mountains,* has been frequently sea and land alternately. Our present continents have often been at the bottom of the sea, and our present ocean beds have often constituted dry land. Now an immense length of time must have been occupied in these alternations. At present, as we have already observed, the outlines of our continents have not been much altered during historic times; some countries are rising a few feet in a century, and others are sinking to the same degree; but what an enormous period must elapse before the dry land and the ocean will have changed places,—a change which geology teaches us has not once, but frequently taken place.

Various other proofs of the antiquity of the earth might have been given. We might have alluded to the elevated terraces, sea-beaches, and coast-lines which are to be seen in many parts of our island; to the extensive denudations which have taken place; to the vast thickness of the sedimentary deposits in the deltas of some rivers;† to the differences of temperature which this earth has experienced; to the proof which geology affords of volcanic action at very different periods; and to the fractures, faults, contortions and displacements of strata, all of which presuppose the lapse of ages: but there is a difficulty in stating these

* We insert this qualifying sentence, because as the igneous rocks come from the interior of the earth, it may be improper to affirm that some of the mountains which are composed of them, and which exhibit no traces of stratified rocks, were once at the bottom of the sea.

† Sir Charles Lyell, for example, calculates that it must have taken more than one hundred thousand years for the formation of the delta of the Mississippi.—"*Principles*," pp. 272, 273, ninth edition. He adds, "This period must be insignificant in a geological point of view, since the bluffs or cliffs, bounding the great valley, and therefore older in date, and which are from 50 to 250 feet in perpendicular height, consist in great part of loam containing land, fluviatile, and lacustrine shells of species still inhabiting the same country."

proofs in a popular form, and besides, those which we have already adduced are perfectly sufficient.

It was supposed at one time that the fossil remains were caused by the deluge of Noah; and that they, being found in all quarters of the world, and at all heights, from the lowest plains to the summits of our highest mountains, were a proof of the universality of the flood. When, however, the thickness of the rocky strata, the different creations, and the dissimilarity between the fossil remains and the creatures presently existing are taken into account, it is evident that such a supposition is most insufficient and extravagant.—Others have attempted to account for these phenomena by supposing that the strata were deposited during the two thousand years which intervened between the creation of man and the flood, and that at the deluge the land and the sea changed places, so that what is now land was before that event the ocean bed.* But here also the cause is wholly insufficient for the effect. Be it observed that the stratified rocks are ten miles in thickness, —that not only one series of creatures have passed away but a succession of creations,—that the land and the sea have not once but frequently changed places,—and that there is a regular order of stratified rocks and of different creations, each requiring an immense period for its duration. Instead of two thousand, two millions of years would be wholly inadequate to account for such changes.—Another most extravagant supposition, advanced by certain writers belonging to the anti-geological school, is, that the earth was created in its present position; so that although the fossils look like the remains of organic beings, yet in reality they never had life, but were created as they are in

* This is the theory adopted by Granville Penn in his "Comparative Estimate of the Mineral and Mosaic Geologies."

a fossil condition. But these writers should think of the consequences of advancing such a theory, as its natural tendency is to lead to downright atheism, by destroying entirely the argument derived from final causes: these fossils exhibiting as plain marks of design, as the existing species.

And now let us collect all these proofs together. When we consider the extreme slowness with which earthy materials are deposited, a few inches at an average only during a century, and compare this with the immense thickness of the rocky strata extending downwards to a depth of ten miles; when we consider the manifold changes of these strata, that beds of shale, sandstone, and limestone are constantly succeeding one another, proving an entire alteration of the circumstances under which they were deposited; when we consider the fossil remains, their immense number amounting to nearly thirty thousand extinct species, and their regular succession not found at random, but as in a cabinet, one series of creatures above another; when we consider that these thousands of species have lived, multiplied, and at length entirely disappeared, and that every formation, and almost every group in each formation, has a creation peculiar to itself; when we consider the frequent alternations of sea and land which the character of the fossils proves, that almost every portion of the dry land which now is must have been repeatedly at the bottom of the sea, and take into account at the same time the extreme slowness with which land is now either elevated or depressed; when we consider all these things together, and numerous other corroborative particulars, which must suggest themselves to every attentive inquirer, we are constrained to assign an antiquity to this earth so great that any present method of measurement entirely

fails; and we are compelled in our reasonings to make an almost unlimited use of the function of time, and to assert that the past duration of our earth would not be exaggerated were we to assign to it, not thousands, but millions of years. "Of old hast thou laid the foundations of the earth, and the heavens are the works of thy hands."*

We have thus traced the age of the earth backward to the time when the first stratified rocks were deposited. But did the world exist before that period? and if so, what was its condition? Here we are surrounded with mysteries; we pass the boundary line which separates what is ascertained from what is only conjectural. But still the light of science illuminates, though feebly, even this distant past, and reveals to us a vast series of ages. It teaches us that in all probability this world was once in a state of intense heat,—that it was a fluid mass,—and that vast periods of time were occupied in the cooling and consolidation of this melted matter, before the stratified rocks began to be deposited. But we do not insist upon this; although probable, it is still only a hypothesis; enough has been adduced to make us adore and wonder. "Great and marvellous are thy works, Lord God Almighty."

Such is the grandeur of the science of geology; by it we penetrate into the immeasurable past, and enlarge our conceptions of the government of God. Astronomy unfolds to us worlds innumerable as subject to His sway. It dis-

* "Those observers and philosophers who have spent their lives in the study of geology, have arrived at the conclusion that there exists irresistible evidence, that the date of the earth's first formation is far anterior to the epoch supposed to be assigned to it by Moses; and it is now admitted by all competent persons, that the formation even of those strata which are nearest the surface must have occupied vast periods,—probably millions of years,—in arriving at their present state."—BABBAGE's *Ninth* "*Bridgewater Treatise*," page 78.

plays to us suns upon suns, systems upon systems, firmaments upon firmaments. It teaches us that, compared with the extent of creation, this world is but a point, a grain of sand, an atom of the works of the Most High. But whilst by astronomy we penetrate into space, by geology we penetrate into time; the one displays to us the empire of God as consisting in unnumbered universes, the other reveals that same empire as having existed for cycles of ages; by the one we are taught that this world is but a point, by the other we learn that its past duration since man was created is but a moment. "Geology," says Professor Hitchcock, "carries us as far back into the arcana of time as astronomy does into the arcana of space. Neither the distance in the one case, nor the duration in the other, can be estimated. But there is a sublime inspiration in the effort to grasp the subject; and I see not why there is not as much grandeur and high gratification in the idea of vast duration as of vast expansion. And I see not why we do not gain as much enlargement of our conceptions of the plans of Jehovah respecting the universe in the one case as in the other."*

But the connection between these two sciences is still more intimate. Astronomy, in its marvellous disclosures, has confirmed the declaration of geology regarding the antiquity of the universe. The power of the telescope has not only disclosed to us innumerable systems invisible to our bodily eyes, it has also revealed to us their immense distances, and, as an inference from this, their vast antiquity. Light, it has been estimated, travels at the rate of one hundred and ninety-two thousand miles a second; it takes about ten years to come from one of the nearest of the fixed stars;

* Hitchcock's "*Religion of Geology*," p. 370.

but, as Sir William Herschell has calculated, from one of the stars of the remote nebulæ it would take two millions of years to reach the earth. Thus, then, these lights are seen by us through the telescope, not as they at present are, but as they were two millions of years ago; the universe, then, must at least have been as old; an antiquity is thus assigned to it which human faculties are altogether unable to grasp. The declaration of geology is confirmed by the declaration of astronomy.

"It has been truly said," observes the great Humboldt, "that with our large and powerful telescopic instruments we penetrate alike through the boundaries of time and space; we measure the former through the latter, for in the course of an hour a ray of light traverses over a space of five hundred and ninety-two millions of miles. Whilst, according to the theogony of Hesiod, the dimensions of the universe were supposed to be expressed by the time occupied by bodies in falling to the ground, (the brazen anvil was not more than nine days and nine nights in falling from heaven to earth,) the elder Herschell was of opinion that light required almost two millions of years to pass to the earth from the remotest luminous vapour reached by his forty feet reflector. Much, therefore, has vanished long before it is rendered visible to us—much that we see was once differently arranged from what it now appears. The aspect of the starry heavens presents us with the spectacle of that which is only apparently simultaneous, and however much we may endeavour, by the aid of optical instruments, to bring the mildly radiant vapour of nebulous masses or the faintly glimmering starry clusters nearer, and diminish the thousands of years interposed between us and them, that serve as a criterion of their distance, it still remains more than probable, from the knowledge we

possess of the velocity of the transmission of luminous rays, that the light of remote heavenly bodies presents us with the most ancient perceptible evidence of the existence of matter. It is thus that the reflective mind of man is led from simple premises to rise to those exalted heights of nature where, in the light-illumined realms of space, 'myriads of worlds are bursting into life, like the grass of the night.'"*

II. THE RECENT ORIGIN OF MAN.

But whilst geology demonstrates the immense antiquity of the earth, it no less positively asserts the recent origin of man. It is evident that if man were as old as the fossil animals, the remains of him would also be found along with them in the rocky strata. His bones are as capable of preservation as the bones of the inferior animals;—the bones of the horse and his rider are both found in equal preservation in what was formerly the field of battle. Now, it so happens, that no remains of man have been found in any deposits, until we arrive at those which are evidently of modern origin. From the uppermost beds of the tertiary downward through the long series of formations there are shells, and bones, and plants, and fish, and reptiles innumerable, but not a single fossil bone of man. All those human skeletons which have been found embedded in limestone are demonstrably of very recent origin.†

* Humboldt's "*Cosmos*," vol. i. pp. 144, 145, Bohn's edition.

† The celebrated Guadaloupe fossil skeletons of men are embedded in a limestone which is known to be at present forming. One of these skeletons is preserved in the British Museum, and another in the Royal Cabinet at Paris. These skeletons are not, properly speaking, petrifactions; on the contrary, it has been ascertained that they retain all their phosphate of lime, and some even of their animal matter. "The skeleton from Guadaloupe," observes Bakewell, "is described as having been found

But the proof is still far stronger, when we consider that if man had existed, not only his organic remains would have been found, but in still greater abundance his works —his tools, his weapons, his buildings, his boats, his houses. Cities have frequently been overwhelmed by volcanic matter, or covered by the gradual deposition of soil; ships have been wrecked or swallowed up by the deep; Pompeii and Herculaneum have been dug up from under the lava of Vesuvius, and the palaces of Nineveh have recently been excavated: but not one work of art, not one tool, not one vestige of man has been found in any of the rocky strata below the alluvium: thus demonstrating that man is one of the most recent of created beings, and that all these various systems of creation which have passed away existed before his introduction into the world.

It is to be observed, that on this important point all geologists are agreed; there is no discordance of opinion among them; and that whilst they all, with united voice, assert the antiquity of the world, they likewise, with an assent no less harmonious, assert the recent origin of man. It is only necessary to quote the words of Sir Charles Lyell, perhaps the greatest of living geologists, "I need not," says he, "dwell on the proofs of the low antiquity of our species, for it is not controverted by any experienced geologist; indeed, the real difficulty consists in tracing back the signs of man's existence on the earth to that comparatively modern period when species, now his contemporaries,

on the shore below the high-water mark, among calcareous rocks full of madrepores, and not far from the volcano called the Souffriere. The bones are not petrified, but preserve the usual constituents of fresh bone, and were rather soft when first exposed to the air. Specimens of the stone present, when examined with a lens, the appearance of smooth grains, consisting of rounded fragments of shells and coral, aggregated and united without any visible cement."—BAKEWELL'S "*Geology*," p. 21.

began to predominate. If there be a difference of opinion respecting the occurrence, in certain deposits, of the remains of man and his works, it is always with reference to strata confessedly of the most modern order; and it is never pretended that our race co-existed with assemblages of animals and plants, of which *all or even a great part of the species* are extinct." And he adds, "No inhabitant of the land exposes himself to so many dangers on the waters as man, whether in a savage or civilized state; and there is no animal, therefore, whose skeleton is so liable to become embedded in lacustrine or submarine deposits; nor can it be said that his remains are more perishable than those of other animals; for in ancient fields of battle, as Cuvier has observed, the bones of men have suffered as little decomposition as those of horses which were buried in the same grave. But even if the more solid parts of our species had disappeared, the impression of their form would have remained engraven on the rocks, as have the traces of the tenderest leaves of plants, and the soft integuments of many animals. Works of art, moreover, composed of the most indestructible materials, would have outlasted almost all the organic contents of sedimentary rocks. Edifices, and even entire cities, have, within the times of history, been buried under volcanic ejections, submerged beneath the sea, or engulphed by earthquakes; and had these catastrophes been repeated throughout an indefinite lapse of ages, the high antiquity of man would have been inscribed in far more legible characters on the framework of the globe, than are the forms of the ancient vegetation which once covered the islands of the northern ocean, or of those gigantic reptiles which at still later periods peopled the seas and rivers of the northern hemisphere."* "The

* LYELL's "*Principles*," vol. i. pp. 245, 246, fifth edition.

comparatively modern period of the creation of man," says Mr. Richardson, "is a fact revealed by Scripture and confirmed by science. The same internal evidence which convinces us of the antiquity of our planet, affords satisfactory proof of the modern origin of our species."* To give only one other quotation, Dr. Owen, the highest British authority on comparative anatomy and palæontology, expresses himself as follows:—"Human bones have been found in doubtful positions, geologically considered, such as deserted mines and caves, in the detritus at the bottom of cliffs, but never in tranquil, undisturbed deposits, participating in the mineral characters of the undoubted fossils of these deposits. The petrified negro skeletons, in the calcareous concretes of Guadaloupe, are of comparatively recent origin. Thus, therefore, in reference both to the unity of the human species, and to the fact of man being the latest, as he is the highest, of all animal forms upon our planet, the interpretation of God's works coincide with what has been revealed to us as to our own origin and zoological relations in his word."

We are enabled, by reason of the discoveries of geology, to interpret aright several passages of Scripture, and especially the opening clause of the sacred records, "In the beginning God created the heaven and the earth." The word creation is an indefinite term, and its sense, in any instance, can only be determined from the meaning of the passage in which it occurs. Sometimes it means making things out of nothing, and at other times forming them out of pre-existing materials. Here the word probably signifies a creation out of nothing, the production of the materials of which the universe is composed. The design of Moses in

* Richardson's "*Geology*," p. 53, Bohn's edition.

this verse appears to be to teach that the universe owed its origin to God. And this creation of all things out of nothing is mentioned by St. Paul, with evident allusion to this passage, as one of the objects of our faith—as a matter of divine testimony. "Through faith we understand that the worlds were framed by the word of God, so that things which are seen, were not made of things which do appear:" thus teaching us that "things which are seen," that is, things which are, were not made of "things which do appear," that is, of previously existing materials. The phrase, "the heaven and the earth," is, in the first verse of Genesis, probably used, according to the idiom of the Hebrew language, to denote the universe. The time, when this creation of all things out of nothing took place, is said to be "in the beginning." The term is indefinite: it may signify the commencement of the six Mosaic days, but it may equally well be referred to a period in past duration, long antecedent to these days. Now it is here that geology elucidates Scripture; it teaches us that the latter interpretation is the true one; that the world was created ages before it was fitted up for the habitation of the human race. And hence we are enabled to interpret the passage—"In the beginning, at some far distant period in past duration unrevealed to us, God created, formed out of nothing, the heaven and the earth—the universe of dependent beings."

Thus, then, we are taught that the first verse of the book of Genesis is introductory; that it contains an independent proposition; it is an assertion of the original creation of the heaven and the earth by God; it fixes the time when this creation took place, indefinitely, "in the beginning," that is at the commencement of time. There is no connexion between the time described as the beginning, and the six days in which the world was put

into its present form; for all that we know, ages may have intervened between them, and geology teaches us that vast ages actually did intervene. There is no violence done to the passage in giving it this interpretation; it admits of it, equally as well as of that which supposes no interval to have intervened between the original creation and the six days; nay, it is preferable to it, for the passage expressly speaks of a previously existing chaos before the commencement of the six days' work, thus suggesting that an interval did exist. Scripture, then, is not opposed to, but illustrated by, the declaration of geology concerning the antiquity of the world. "When," says Dr. Whewell, "the language of Scripture, invested with its new meaning, has become familiar to men, it is found that the ideas which it calls up are quite as reconcilable as the former ones were, with the most entire acceptance of the providential dispensation. And when this has been found to be the case, all cultivated persons look back with surprise at the mistake of those who thought that the essence of the revelation was involved in their own arbitrary version of some collateral circumstance in the revealed narrative."*

It is also to be remarked, that this interpretation of the sacred record was adopted by many eminent divines long before geology was ever heard of. It is not a new meaning forced upon the passage by geology; it is an old view of the subject proved to be correct. In particular, this was a favourite interpretation of the early fathers. Justin Martyr, Origen, Augustin, Cæsarius, Basil, Gregory Nazianzen, and Theodoret, all taught that the first verse of Genesis describes the creation of matter as an independent proposition, and that an indefinite period elapsed between

* Whewell's "*Philosophy of Science*," vol. ii. p. 146.

the creation of the world and its present arrangement.* Similar also were the views of some divines in the Protestant church. Thus Bishop Patrick, who wrote two hundred and fifty years ago, in his commentary upon the first verse of Genesis, says, "How long all things continued in mere confusion after the chaos was created, before light was extracted from it, we are not told. It might have been, for any thing that is here revealed, a great while; and all that time the mighty Spirit was making such motions in it, as prepared, disposed, and ripened every part of it for such productions as were to appear successively, in such spaces of time, as are here afterwards mentioned by Moses, who informs us, that after things were digested and made ready (by long fermentation perhaps) to be wrought into form, God produced every day, for six days together, some creature or other, till all was finished, of which light was the very first."

But geology not merely illustrates, it also confirms Scripture. It teaches us the important fact that man is the most recent of created beings. This is a point of great importance, and one which demonstrates the strict harmony which there is between this science and revelation. The recent origin of man is one of the most satisfactorily proved facts of geology, and is therefore a strong and unanswerable confirmation of the sacred record. Thus geology, although taunted and attacked by men who knew it not, —although regarded by divines with a suspicious eye,— has proved itself to be the handmaid of revelation; it brings all its rich treasures, and lays them at the footstool

* See an account of these opinions of the early fathers concerning the creation of the world in CARDINAL WISEMAN'S "*Lectures on the Connexion between Science and Revealed Religion*," vol. i. p. 297.; and in SMITH'S "*Geology and Scripture*," p. 164, Bohn's edition.

of the throne of the Eternal; and, like its sister science astronomy, it fills the mind of the devout worshipper with feelings of awe, veneration, and love for the great Creator. "And surely," as an eminent dignitary of the Romish church eloquently observes, "it must be gratifying thus to see a science, formerly classed, and not, perhaps, unjustly, among the most pernicious to the faith, once more become her handmaid; to see her now, after so many years of wandering from theory to theory, or rather, from vision to vision, return once more to the home where she was born, and to the altar at which she made her first simple offerings; no longer, as she first went forth, a wilful, dreamy, empty-handed child, but with a matronly dignity, and a priest-like step, and a bosom full of well-earned gifts, to pile upon its sacred hearth. For it was religion which gave geology birth, and to the sanctuary she hath once more returned."*

It is evident that the fact of the vast antiquity of the earth should now be generally taught, and the common erroneous notion that the world is only six thousand years old abandoned and discarded. It is wrong to disturb old cherished opinions on religious subjects without some good reason; but when these opinions have been clearly demonstrated to be erroneous, it is then full time to communicate more correct views. Now no fact of science, not even the revolution of the earth around the sun, has been more clearly demonstrated, than that this world is much older than six thousand years; this is one of those established facts which now admit neither of doubt nor debate; to do either is to evince a mind incapable of scientific reasoning. And there now exists no reason why this should

* Wiseman's "*Lectures*," vol. i., p. 321, 322.

not be as generally taught as the Copernican system of the universe. Every man and child should be made aware that the common opinion, that this world was created six thousand years ago, is erroneous, and that its age is immensely greater. Let it never for a moment be allowed or inferred, that such a notion of the recent creation of the world is taught in Scripture; on the contrary, let the language of Scripture on this subject be properly interpreted and explained; for nothing is more calculated to undermine a man's belief than the discovery that the demonstrated facts of science are in manifest and irreconcilable opposition to what he has been accustomed to regard as the revelation of Scripture.

We have in this chapter demonstrated the immense antiquity of the world, or rather we have proved that its age is incalculable—that ages were occupied in the formation of a single system—and that the past duration of the world must be reckoned by millions rather than by thousands of years. The mind is staggered and bewildered in endeavouring to comprehend a duration so immense. But it is because we contemplate time with reference to our own short ephemeral existence upon earth. We speak of days, and months, and years. But these are feeble terms when we would wish to calculate the age of the world: we must have another standard; we must contemplate time in another point of view. Let us then contemplate time with reference to God. A thousand years appear to us to be of an immense duration, but in His sight it is but as yesterday when it is past, or as a watch by night. Compared with His past existence, millions of years are but a short duration: the vast antiquity of the world itself appears no longer immense. However unlimited the drafts may be which geology makes on time, let us not be

alarmed or disturbed at it; we are certain that the universe had a commencement; that far distant in the past there was a beginning when God created the heaven and the earth. Time with reference to the Deity is a very different thing from time with reference to us: to Him these immense cycles are not long; and the different creations which geology discloses are His creations, and therefore, the time occupied by them must be contemplated, as it relates to God and not to ourselves. "One day is with the Lord as a thousand years, and a thousand years are as one day."

And if this subject impresses us with a profound sense of the eternity of God, it should also teach us the ephemeral existence of man. What are the threescore or the fourscore years of man's existence compared with the past duration of the world? What is the antiquity of those mighty empires that once ruled over the destinies of men? What the age of those pyramids of Egypt, whose origin is lost in darkness? What the past duration of the human race itself, the six thousand years since Adam was created? It is but as yesterday—but a moment of time compared with the ages that are past. The duration of man is not in the past but in the future. His past existence is but as the lightning's flash, which appears only to vanish; but his future existence is unlimited—*it* is an eternity—a period inconceivably longer than even the immense duration of the world. This future eternity is the destiny of all of us, a solemn and awful thought, which should excite us to increased diligence in cultivating a meetness for the heavenly world, so that by securing an interest in a better righteousness than our own, we may be found without spot and blameless at the appearance of Jesus Christ.

CHAPTER III.

SUCCESSIVE CREATIONS OF SPECIES.

In this chapter we propose to make a few remarks on the successive creations of species, to direct attention to that remarkable series of different creations which the fossiliferous rocks disclose, and to exhibit the bearing which these examples of creation have upon several important points, both of natural and revealed religion. We are admitted, as it were, to inspect a system of creations, to mark the work of the Lord in calling new creatures into being, to discern the direct exertion of His almighty power, and to see in all this the manifest proofs of His divine existence and over-ruling Providence.

Geologists, as we have observed in a previous chapter, have demonstrated that in the fossiliferous rocks there is a series of different creations. The fossil organic remains are not found among the rocks in a confused state, mingled together without order, but are regularly arranged as in shelves; so that when we pass from one geological formation to another, we at the same time pass from one system of creation to another. These systems are distinct from each other. A few fossils of one formation may have penetrated into the formation which succeeds it, but still it is one of the best ascertained facts of geology that each formation has its own set of fossils.* The organic remains

* "The mountain limestone of the north of England," observes Professor Phillips, "contains about five hundred species of animal remains:

of the old red sandstone are very different from those of the carboniferous formation which immediately succeeds it. And not only is this true of the different formations, but, as many distinguished geologists affirm, even of the groups into which each formation is divided. "It is now a truth," observes Agassiz, "which I consider as proved, that the *ensemble* of organised beings was renewed, not only in the interval of each of the great geological divisions which we have agreed to term formations, but also at the time of the deposition of each particular member of all the formations." So entire has been the change, so distinct are these formations, that, with the exception of some microscopic insects, not one of the existing species of plants and animals has been discovered in the chalk, although that is a formation comparatively recent, and separated only from the present by the tertiary.* All the existing beasts, and birds, and fishes, along with man himself, were introduced at a period which, according to the annals of geology, is only as yesterday.† Not a vestige of them is to be found in any of the rocks, except in the uppermost beds. Thus the world has changed its inhabitants over and over again;

the lias one hundred and twenty, and the chalk fifty. Now of all the six hundred and seventy species contained in the mountain limestone, lias, and chalk, respectively, there is *not one* which is found in two of these rocks. Neither of these strata contains a single fossil which is found in either of the others. Between the era of the formation of the mountain limestone, and that of the lias, the whole animal population of the sea had been entirely changed, and a similar complete renewal took place before the chalk was deposited."—PHILLIP'S "*Geology*," p. 67, 68.

* These microscopic insects have been discovered by Professor Ehrenberg.

† "Every plant and animal that now lives upon earth began to be during the great tertiary period, and had no place among the animals and plants of the great secondary division."—MILLER'S "*Testimony of the Rocks*," p. 195.

the species has died as well as the individual; one group of plants and animals has passed away, and has been succeeded by another, and this again has yielded to a third; and so, during the incalculable ages of a past duration, one creation has followed another, until at length man and the present race of plants and animals were called into being.

It would be foreign to our object to enter into any minute description of the different systems of creation which have successively occupied this world; all that is necessary is to give a list of them in their order. The lowest fossiliferous formation is what has been termed the Silurian system. The fossils found in it are chiefly shells, and a peculiar animal termed the trilobite, of an extinct genus, but of the same order as the crab and lobster. The system also contains fossil fish of so distinct a nature, that almost the entire class has passed away. Next follows what has been termed the Old Red Sandstone or Devonian system. The fossils of this formation are chiefly fish of extraordinary forms, and often of gigantic size; some armed with strong plates of bone to resist the attacks of foes, some furnished with weapons of offence and attack, and some with a pair of fins spread out like wings. To this succeeds the Carboniferous formation. Here the scene of creation is changed: we quit the sea for the dry land. Plants now abound. Trees of a peculiar form, gigantic ferns, and reeds, and mosses now grow upon the earth. There is a vegetation far more abundant than the world has ever since seen. Almost all the coal which we consume belongs to this formation, and once constituted the trees and forests of the world that then was. Next succeeds what formerly was termed the New Red Sandstone.*

* The New Red Sandstone system has been divided by geologists, on account of the remarkable differences of the fossils, into two distinct

This is a system, at least in our country, comparatively barren of fossils. Fish are its chief characteristics; there are also a few forms of reptile life, and the footprints of gigantic birds, larger than any which now exist, are found impressed upon the rocks. After this succeeds the Oolite. This is what has been appropriately termed the *age of reptiles.* Reptiles of a gigantic size, far exceeding the crocodile of the Nile, and of a strange shape, rivalling the fabulous monsters of antiquity, abound. One of them, the ichthyosaurus, a monster thirty feet in length, with immense jaws, like those of a crocodile, and conical teeth of large size, which prove that the animal was fierce and voracious; another, the plesiosaurus, a creature of similar length, but with an enormous neck, far longer than that of a swan; and a third, the pterodactyle, a flying reptile, furnished with wings. Here also mammalia appear for the first time, in the form of small marsupial and insectivorous animals.* The Chalk or Cretaceous system follows—a formation which has been chiefly formed in deep waters, and consequently contains shells and the remains of fish, but all of them of so peculiar a nature that it is doubtful if a single species survives. After this, comes the Tertiary formation: this is *the age of mammalia.* There are discovered the remains of beasts, which in size far exceeded the elephant; one of them, the mega-

formations, the Permian and the Triassic. At this point the forms of organic life appear to have undergone an entire change: the Permian constituting the close of the Palæozoic, and the Triassic the commencement of the Secondary or Mesozoic period.

* The marsupial animals have been discovered in the Stonesfield slate belonging to the great oolite group; and the insectivorous mammals have been very recently discovered in the Purbeck limestone, a fresh-water bed, classed by Lyell in the upper oolite, and by other geologists in the Wealden.

therium, an animal similar to the sloth, but of the most enormous proportions; and another, the deinotherium, resembling the hippopotamus, but furnished with two large tusks like a pickaxe, appended to the lower jaw, and curved downwards, to enable it to dig up the roots of plants on which it subsisted. Several species of the Tertiary formation survive, but the greater number have become extinct. To it succeeds the present formation—that race or creation of animals and plants which now occupies the earth.*

But it is the bearing which these examples of different creations have upon several important questions of natural and revealed religion, that we propose chiefly to consider. Now, two views or theories have been taken of this subject: the one is, that these systems of creation have developed themselves from each other, and this theory is usually known in this country by the name of the *development hypothesis:* and the other is, that they are the result of a series of immediate interpositions by the divine Creator—the *theory of creation by divine interposition.*

I. In the first place, then, we advert to *the development hypothesis.*

This theory is of ancient date, being very similar to the philosophy of Democritus and other heathen sages. Lamarck in France formed it into a system, and it has recently been revived and popularised by an anonymous writer in our own country.† According to this theory, the germs

* These are the more important divisions into which geologists have divided the fossiliferous rocks, but there have clearly in each of these systems or formations been several creations.

† Although the "*Vestiges of Creation*" is well written, contains some ingenious speculation, and had at one time no little notoriety, it was never considered by any competent authority as of the smallest scientific

of all existence consist in minute and often invisible particles termed "monads." How life has been bestowed upon these germs, the advocates of this hypothesis are not agreed; some suppose that this has been effected by galvanic agency, and others that there is a living principle in nature. These monads or germs gradually develop themselves into a higher life; they receive additions of new particles; they develop new powers; these powers develop new organs; and thus, throughout the past geological ages, they have been advancing from a lower state of development to a higher, from molluscs to fish, from fish to reptiles, and from reptiles to mammals, until at length they have reached the present race of creatures; so that man himself owes his origin to one of these germs, and has passed through the various successive stages of existence, until he has reached the most elevated rank in the scale of being.

Farther, according to this theory, the habits and inclinations of animals are not adapted by the divine Being to their peculiar bodily organs; but these organs have been developed or formed by previously existing habits and inclinations. Thus, for example, a propensity for swimming has developed the fins of a fish, a propensity for flying has developed the wings of a bird, and a propensity for walking has developed the feet and legs of quadrupeds. The long neck of the cameleopard has been formed by its

value. Its author's scientific information was evidently of the most meagre, superficial and inaccurate description. Indeed, some apology may be needed for alluding to a work which may now be considered as happily consigned to a well deserved oblivion, and for noticing an hypothesis, already fully and finally disproved; but it seemed impossible to treat of the succession of species without adverting to this hypothesis, and, considering its former popularity and its pernicious tendency, without offering a refutation of it.

attempts to reach the branches of trees on which it fed; the webbed feet of the duck is the result of its repeatedly stretching out its toes when swimming; and the teeth and stomach of beasts of prey have been developed in the course of many generations in consequence of the animal food on which they subsist. In short, all animals have their present forms and organs, not because they were originally created so by God, but from the force of external circumstances which has given rise to their different forms and developed their peculiar bodily organs.*

Although, at first sight, we may suspect this theory of positive atheism, inasmuch as it removes God entirely from the creation and substitutes a certain blind instinct termed law; and although the former assertors of this system openly avowed their disbelief in a personal Deity; yet the modern advocates of the development theory escape the inference so apparently deducible by asserting, that this principle of development in nature—this tendency to rise from a lower to a higher state owes its origin to God: that when God created matter at first, he endowed it with this plastic nature.

But although it thus escapes the charge of atheism or the denial of a Supreme Being, it is of such an infidel tendency, as to render the acknowledgment of God of no value. It removes the divine Being so entirely from His works, and so dispenses with His agency, as virtually to dethrone Him, and to substitute in His place the god of Epicurus. It is founded on gross materialism, and takes no cognizance of the mental or moral nature of man. It is directly at variance with the doctrine of immortality. Man, according to this theory, is derived from one of the

* LAMARCK'S "*Theory of the Transmutation of Species.*"

inferior animals by a process of gradual development. Hence then it follows, either that man, like the inferior animals, is mortal, or that the addition of a few atoms confers immortality on a creature which before did not possess it. The immense difference between man and the inferior animals, which the doctrine of immortality supposes, is by this theory denied. But especially is this notion in direct variance with the Christian religion. It not only flatly contradicts all those passages which speak of creation as the direct work of God, but is opposed to that miraculous intervention of the Supreme Being by which Christianity was introduced into the world. On such a theory, where is the use of a Saviour? Man is not a degraded being, but is developing himself into a higher order; and therefore a scheme to restore him to his original purity and dignity has under this hypothesis no place. In short, to adopt the language of Professor Sedgwick, it is "an hypothesis which, avowedly, banishes God from any providential government of the world; repudiates, and scoffs at, any teaching, except such as springs by physical necessity out of a universal scheme of materialism—a scheme which makes religion but a fable, religious teachers but a band of cheats, and a petition sent up to God in prayer but a blind and ignorant effort to reverse or tamper with the unchangeable laws of nature."* Such being, in our opinion, the demoralizing tendency of this theory, it is of some importance to prove that it stands upon no philosophical basis, that there exist no grounds whatever for it; and it becomes worthy of refutation, not on account of its philosophical plausibility, but only on account of its mischievous tendency.

* Sedgwick's "*Discourse on the Studies of the University of Cambridge.*" —Supplement to the Appendix, p. 309, fifth edition.

Such a theory is a mere dream and delusion; it is based upon mere assumptions and negative statements, and is wholly unsupported by a single scientific fact. The discoveries which have recently been made among the various species of the animalcules have shown that life and organization descend to a much lower form than we had any conception of. Every drop of water and every blade of grass swarms with animal life. Formerly it was supposed that these infusorial animalcules were the monads or germs of existence—mere animated globules; but the microscope has now disclosed them to us as possessed of various organs, and many of them as wonderfully formed and as completely developed after their kind as man himself; thus destroying entirely the notion of a self-creative power in nature producing the mere rudiments of existence. And with regard to the other part of the theory, the development of new organs, not one single example can be produced where a new bodily organ has developed itself. Animals, so far as we know, continue to be as they were, as far back as we can trace their species. There are fixed bounds to each species beyond which it cannot pass. It has been asserted that development requires time; but not to say that this is a mere assertion founded on our ignorance, we have demonstrative proof that for the last three thousand years animals have continued as they are, —that there has been no change on them, either for the better or for the worse. In the catacombs of Egypt there are mummies, containing not only the bodies of human beings, but the remains of sacred animals. These remains have been minutely examined by Cuvier, and higher authority on such a point never existed, and he declares, that there was no more difference between them than between the human mummies and the embalmed bodies of men of

the present day. "Among the Egyptian mummies thus procured," Sir C. Lyell informs us, "were not only those of numerous wild quadrupeds, birds, and reptiles; but, what was perhaps of still higher importance in deciding the question, there were the mummies of domestic animals, among which the bull, the dog, and the cat, were frequent."* Three thousand years have passed away since these animals have lived, and yet no change in the species has occurred. To assert that even this is too short a period is a confession that the known facts of science are all against the theory—that, in short, the system of development is a mere dream which admits not of argument or proof.

But this theory of development is not only unsupported by scientific facts, but is in direct opposition to the deductions of comparative anatomy and physiology. It is now an ascertained fact, that all the parts and organs of an animal are so joined together, and so dependent upon each other, that no change can take place on one of them without a corresponding change upon all the rest. "Every organised individual," observes Cuvier, "forms one organised system of its own, all the parts of which mutually correspond and concur to produce a certain definite purpose, by reciprocal reaction, or by combining towards the same end. Hence none of these separate parts can change their forms, without a corresponding change in the other parts of the same animal." Change, for example, the teeth of a tiger into teeth resembling those of an ox, and, in order to its existence, the entire form, and organs, and habits, and food of the animal would have to be changed;—a change so great as to amount to a new creation. Besides, it is a

* Lyell's "*Principles*," p. 586, fifth edition.

contradiction to assert, that the habits and inclinations of animals have given rise to or developed their several organs; for this would be to suppose animals to desire contrary to their inclinations. The natures of animals are perfectly adapted to their peculiar habits and instincts; and therefore admit of no development, so far as the influence of inclination can produce a change. To suppose a fish, for example, to develop itself into a bird, is to suppose it to act in opposition to its own proper nature and to its peculiar habits, instincts, and propensities.*

But it is especially to the science of geology that this theory of development appeals. It is asserted, that in the lowest fossiliferous strata we have only the rudiments of existence, a few shells and worms; that as we ascend, existence improves and developes itself: that there is a regular system of progression from a lower order of beings to a higher, from molluscs to fish, from fish to reptiles, and from reptiles to mammals, until we reach the present race of animals. The facts of geology, however, so far from being favourable, are found to be entirely against this theory. The lowest fossiliferous formation, the Silurian, does not, as has been represented, contain only the rudiments and embryos of existence. It is true that the chief fossils discovered in it are shells, but several of these are not of the lowest but of the highest class of their order.† There are also fish, and these not of a low but of a

* Lucretius and the ancient atheists supposed that the organs first existed by chance, and that these gave rise to their uses: Lamarck and the modern transmutationists suppose that the function existed first and developed the organ.

† "The Bivalve Mollusca," says Professor Phillips, "of the oldest Snowdonian rocks (the lowest fossiliferous group) were certainly as complicated, nay, more highly organised, than the greater number of conchifera of the present ocean, since they belong to the brachiopoda."

high type, being animals of at least as high a nature as the sharks of the present creation.* "All our most ancient fish," observes Professor Sedgwick, "belong to a high organic type; and the very oldest species that are well determined fall naturally into an order of fishes which Owen and Müller place, not at the bottom, but at the top of the whole class."† And whilst it is true, that, so far as has been discovered, the order of fish has preceded the higher order of reptiles, and the order of reptiles the higher order of mammals, and that thus there is a system of progression: yet at the introduction of each of these orders, it was not one of the lower, but of the higher families which first appeared. The fish of the Silurian and Old Red Sandstone are high up in the scale of fishes; the reptiles of the Lias and Oolite are more highly organised than any of the class which now exists; and the mammals of the Tertiary are larger in bulk than any which now inhabit the earth. In each of these orders there has been no development from a lower to a higher class: it was the higher which were first introduced. Nor is there to be found in all the strata, from first to last, a single instance of development. A species has, after having existed for ages, disappeared, and been succeeded by another and an entirely different one; but there is no evidence whatever, that the latter species is in any way connected with the former—there are no connecting links between them. In short, although geology does disclose a system of pro-

* "The lower Silurian," said Sir Roderick Murchison in 1847, "is no longer to be viewed as an invertebrate period; for the *onchus* (a species of fish) has been found in the Llandeilo flags and in the lower Silurian rocks of Bala."

† Sedgwick's "*Discourse on the Studies of the University of Cambridge*,"—p. lxiv., Preface, fifth edition.

gression and improvement, yet it is not a progression by development, which, as it demonstrates, has never existed. "There was a time," remarks Hugh Miller, "in which the ichthyic form constituted the highest example of life; but the seas during that period did not swarm with fish of the degraded type. There was, in like manner, a time when all the carnivora and all the herbivorous quadrupeds were represented by reptiles; but there are no such magnificent reptiles on the earth now as reigned over it then. There was an after time, when birds seem to have been the sole representatives of the warm-blooded animals; but we find, from the prints of their feet left in sandstone, that the tallest men might have

'Walked under their huge legs, and peeped about.'

Farther, there was an age when the quadrupedal mammals were the magnates of creation; but it was an age in which the sagacious elephant, now extinct, save in the comparatively small Asiatic and African circles, and restricted to two species, was the inhabitant of every country of the Old World, from its southern extremity to the frozen shores of the northern ocean; and when vast herds of closely allied and equally colossal genus occupied its place in the New."*

Thus then geology, so far from exhibiting a system of progressive development of the several orders from a lower to a higher state of being; shows rather the reverse,—a system of degradation. The fish reached the climax of their development during the periods of their earliest existence, when they swarmed in the seas of the Silurian and Old Red Sandstone worlds. The reptilia, especially, were

* Miller's "*Footprints of the Creator.*"—Second edition, p. 179.

of a far higher class and type, when they were represented by those huge monsters, whose skeletons we find embedded in the rocks of the Oolite formation, than by the existing animals of their order. And the quadrupedal mammalia of the Tertiary, were as a class more gigantic than the order which now exists. Facts such as these, whatever their explanation may be, are entirely at variance with the above hypothesis; for they demonstrate that there was no system of progressive development—no scale of being from the lower to the higher organisms discoverable in the fossiliferous rocks; and hence it is that every geologist of any name or standing is opposed to such a scheme of development, as being untrue to fact.

The case, as geology discloses it, appears to be this. Each order of animals was introduced at separate periods: and whilst there appears to be no development or advance in any particular order, yet upon the whole there is a great advance in creation—the lower order has been succeeded by the higher. The fish appear to have been first called into existence; they were of a high type and class: this age of fish was succeeded by the age of reptiles, reptiles of gigantic size and high organization: the age of reptiles was succeeded by the age of quadrupedal mammals; and, during the deposition of the Tertiary, mammalia appear to be the characteristic and ruling animals of that period: and the age of quadrupedal mammals was succeeded by the age of a being of still higher order, endowed with more exalted powers, and appointed to a far higher destiny—the age of man.* Thus then there has been an evident

* "We know as geologists," says H. Miller, "that the dynasty of the fish was succeeded by that of the reptile,—that the dynasty of the reptile was succeeded by that of the mammiferous quadruped,—and that the dynasty of the mammiferous quadruped was succeeded by that of man as

progression; the higher orders have succeeded the lower—the reptiles the fish, the quadrupedal mammals the reptiles, and man the quadrupedal mammals; at each period an order of creatures was introduced, greatly in advance of its predecessor; there was a gradual disclosure of the perfections of God—a disclosure which probably formed the subject of praise and admiration to the higher intelligences above. But, observe, this progression is not cut off from the immediate interposition of God; it is not the result of blind chance or necessity; but it is inseparably linked with the creative energy of the Most High, and is a manifest proof of His miraculous interposition.

If it be inquired, Why were not the higher orders of being created at once? Why was man, the lord of nature, formed so late? Why for so long a period did there exist nothing but irrational animals? It may be reasonably replied, that all these questions are presumptuous, that time is very different to God and to us, and that a gradual disclosure of His perfections appears to be best adapted to the imperfect capacities of His rational creatures. But there also appear to have been physical reasons. These different orders of animals were not introduced until the earth was prepared for their reception. At first, the earth appears to have been in such a state of heat as to be incapable of supporting any living creature. At the time when

man now exists,—a creature of mixed character, and subject, in all conditions, to wide alternations of enjoyment and suffering. We know, farther,—so far at least as we have yet succeeded in deciphering the record,—that the several dynasties were introduced, not in their lower, but in their higher forms: that in short, in the imposing programme of creation it was arranged, as a general rule, that in each of the great divisions of the procession, the magnates should walk first. We recognise yet further the fact of degradation specially exemplified in the fish and the reptile."—MILLER'S "*Footprints*," p. 301.

the earth was prepared for them, fish were introduced; and so with all the other animals, each produced in his own season, and fitted to the peculiar state of the world, until at length the earth was brought into such a state as to receive the human race. Every system of creation is adapted to the state of the climate that then was; so that the different systems would have perished had they changed places. In the time of the Carboniferous formation, the atmosphere appears to have been charged with carbonic gas, destructive to the life of the higher animals; and during the early Tertiary periods, the general temperature was equal to that of the torrid zone. There has been a constant advance and improvement of the inorganic world; it has become more suited to higher orders of being; and therefore we find that these higher orders have been introduced by an all-wise and benevolent Deity. "We have only," observes Dr. Hitchcock, "to suppose that the Creator exactly adapted organic natures to the several geological periods, and we perfectly explain the phenomena of organic remains."* "The great organic changes," remarks Professor Sedgwick, "were brought about, not by gradual transmutation wrought among the specific types during a long lapse of ages, but by altered conditions to which the organic types were successively adapted."†

It is also to be observed, with regard to this development theory, that it is opposed by all the scientific men of the age. Whatever may be the opinions of these men on religious subjects, however indifferent some of them may be to Christianity, whatever may be the peculiar branches of natural science to which they have directed their attention, yet they all, with united voice, declare against the

* Hitchcock's "*Religion of Geology*," p. 258.

† Sedgwick's "*Discourse*," &c., Preface to the fifth edition, p. lxix.

hypothesis of development. It has not received the support of a single great man of the present day—it cannot reckon among its modern advocates a single great name. All our eminent geologists, Lyell, Murchison, Sedgwick, Buckland, De la Beche, D'Orbigny, Hugh Miller, and Edward Forbes; all our great zoologists, physiologists, and comparative anatomists, Cuvier, Agassiz, Owen and Roget; all our distinguished botanists, Lindley, Harvey, and Hooker—all with united voice declare against it,—each in his own department asserts that it has not a single fact in its favour, and that it contradicts the ascertained facts of science, and that, however plausible it may appear to men of narrow views and limited acquirements, it is opposed to all those general deductions which constitute the higher walks of science.*

II. But we now proceed, in the second place, to offer a few remarks on *the theory of creation by Divine interposition.*

We have seen that the theory of development has not a single fact or argument to support it—that it is opposed to many of the deductions of science—that it is at variance

* "I believe very little," observes Agassiz, "in the genetic descent of living species from those of the various tertiary layers, which have been regarded as identical, but which, in my opinion, are specifically distinct. I cannot admit the idea of the transformation of species from one formation to another. In advancing these general notions, I do not wish to offer them as inductions drawn from the study of any particular class of animals, and applied to other classes, but as the results of direct observation of very considerable collections of fossils, of different formations, and belonging to different classes of animals, in the investigation of which I have been specially engaged for many years." In Lyell's "Principles" there is a most masterly refutation of the hypothesis of Lamarck. Miller's "Footprints of the Creation," and Sedgwick's Preface to the fifth edition of his "Discourse on the Studies of the University of Cambridge," are most able answers to the "Vestiges of Creation."

with the disclosures of geology—and that no scientific writer of any note or name has given it his support. The other theory that has been advanced to account for the fact of creation, is, that God has directly interposed, and that creatures owe their existence to His immediate agency.

In the fossiliferous strata we see that various species of animals have existed, and after a time disappeared. Their disappearance or extinction may very easily be accounted for by a change of circumstances. The dry land may have become sea, or the sea dry land, and thus all the animals which inhabited the one or the other must have perished. The climate may have changed, a warm temperature may have been succeeded by one much colder, or inversely, and this would cause a corresponding change in the animal and vegetable world. We know that toward the close of the Tertiary formation the temperature was greatly altered during the drift period, and we also know that in consequence of this alteration numerous species disappeared. So also the drying up of any large inland lake, as for example, Lake Superior in America, which, according to the calculations of Sir C. Lyell, must one day take place, would cause the extinction of several peculiar species of plants and animals which are found only there.* In short, it is now an ascertained fact in geology, that "the greatest changes of organic types among the strata are connected with physical revolutions."† But the place

* Agassiz has discovered in Lake Superior and the neighbouring lakes several species of fish not found in any other water.

† "I affirm it as certain truth, that the greatest changes of organic types among our strata *are* connected with *physical revolutions*, and that it is by a change of conditions, and not, properly speaking, by a lapse of time, that we can rationally interpret the organic sequence of the old world."—SEDGWICK's "*Discourse*," Preface to the fifth edition, p. lxxxv.

of extinct animals in creation has been supplied by other creatures of a distinct nature. Now, whence did they come? What cause produced them? They could not, as we have seen, possibly be developed from those which preceded them; nor was there any thing in the nature of the catastrophe which destroyed the former race of animals that could call them into being. God alone can be the Author of their existence—the animating Spirit of the Lord must have moved upon the surface of the earth. We have here an instance of the immediate interposition of God —a proof of the existence of the Supreme Being who called these creatures into existence, and re-peopled the world. He it was who spake the word, "Let the waters bring forth abundantly, and let the earth bring forth the living creature after his kind;" and the effect followed: the seas were again filled, and the land was again occupied with created beings. What Sir Isaac Newton observes with reference to the arrangements of matter, is still more applicable to the introduction of new systems of living creatures. "The growth of new systems out of old ones, without the mediation of a divine power, seems to me to be apparently absurd."

But especially does this direct interposition of God appear most signally in the recent origin of man. That the introduction of man into the world was at a period comparatively recent, is a fact admitted by all geologists. No remains of him, nor any of his works, are to be found in any of the fossiliferous rocks. In the Tertiary formation there are the remains of some animals which now exist, but there is not the vestige or the trace of man. It is not until we come to the alluvium that we discover his bones and his works. Thus, then, we can point to long cycles of ages when man was not, and to the precise epoch when

he began to be.* Geology, then, discloses the great fact of the introduction of the human race. And surely when we consider the vast distance which there is between man and the inferior animals, the mental and moral powers with which he is endowed, it is the height of extravagance to suppose that he owes his existence to development. The interval between man and the highest of the inferior animals is wide and unfilled up. We have not only to account for the bodily shape of man, but also for his mental nature. Man, then, is the immediate work of God, far superior to, and removed from, any creature which now exists, or has in former geological ages existed upon the earth. "So God created man in His own image, in the image of God created He him."

It was formerly a favourite argument among atheistical writers, that there has been an eternal series of all the animals which now inhabit the earth. Thus, according to them, things have continued as they were from the beginning; each species has propagated its own kind during the infinite ages that are past: there has been an eternity of each kind of animals. Man, for example, instead of being created at a particular period, has, as a race, existed from eternity. We have not now, as formerly, to betake ourselves to metaphysical arguments against this objection; the science of geology entirely confutes it; it sweeps away the foundation on which it stands. It points back to a period when it asserts, without the slightest possibility of

* "Independently of every written testimony, we prove by natural evidence that man, with all his powers and appetencies, his marvellous structure, and his fitness for the world around him, was called into being within a few thousand years of the days in which we live—not by a transmutation of species, (a theory no better than a phrenzied dream,) but by a provident contriving power."—SEDGWICK'S "*Discourse*," p. 26, fifth edition.

mistake, and without the least fear of contradiction, that man and all the present race of animals were not. Thus, then, it is an ascertained fact, that each of the existing species had a beginning; and thus the infinite series of the atheist can have no place in modern science.

But the fact of creation not only contradicts the notion of the atheist, it also confutes the argument of the infidel against the miracles of the gospel. The infidel argues that a miracle cannot be proved, because it is contrary to uniform experience—that the laws of nature have ever been constant—and that no testimony whatever can establish a miracle, because it is as probable that the testimony may be false as it is that the miracle may be true. Now, not to dwell upon the fallacy of this argument, we have in geology examples of divine interpositions, that is of miracles, in the repeated introductions of different species of animals. Here are miracles: plain, palpable, and undeniable miracles. The miracle of creation has been repeated over and over again. Thus, then, miracles cannot be said to be contrary to experience; we have demonstrative evidence that they have frequently occurred. And, observe also, this evidence is not derived from testimony; it is the evidence of our own senses; we can read it with our own eyes; we have only to look for ourselves; to examine the rocks, and the fossil remains which they contain, in order to come to the inevitable conclusion of all geologists, that throughout the vast ages of the past there has been a series of creations distinct from each other.* We appeal, then, to these

* "Even Hume," observes Professor Hitchcock, "would hardly deny that the creation of whole series of animals and plants was miraculous; and yet, in proof of that creation, we need not depend on testimony; for we can read it with our own eyes upon the solid rocks."—Hitchcock's "*Religion of Geology*," p. 279.

creations as infallible proofs that God has interfered in the government of the world, and therefore as confutations of the assertion that He has never so interfered. And if God has thus wrought miracles to repeople the earth with new creations, it is still more probable, that He would interpose when the human race, destined for immortality and formed in His image, had fallen into a state of moral ruin, in order to reveal His will concerning them, and to manifest Himself, not merely as the Creator, but in the still higher character as the Saviour of the lost.

And still farther, we think the argument may be applied, not merely to the miraculous, but to the special Providence of God. There are some who suppose that no such special Providence exists; that all is ordered by unbending and inflexible law; that, for example, it is useless to pray for rain in the time of drought, or for health in the time of sickness, or for safety in the time of danger—that all things depend upon the laws of nature, and the laws of nature are constant. But when I read in my Bible of God's care for each of His creatures; when I read about the numbering of our hairs, and the fall of a sparrow; I cannot believe in the non-existence of a special Providence. And when I see in the rocks that Providence has been exercised over and over again, and that not merely in the creation, but in the various adaptations of the different animals, in their extinction as well as in their introduction; I am led to suppose that the same reign of Providence continues. I see numberless ways and means in which this Providence can be exercised without any direct or at least sensible interference with the laws of nature. The divine Being, who holds the hearts of all men in His hands, can so dispose and influence their minds as to bring about His purposes. He can suggest thoughts within them, by the

inspiration of His Spirit, unknown to them, and thus by this means alone effect an entire change upon the circumstances, not only of the individual himself, but of those connected with him. And thus, almost in every case, by an exertion of a divine influence on the minds of ourselves or others, our prayers may be directly answered. And as to the external laws of nature, there may be secret ways, hidden and concealed from us, by which even these may be influenced, so that the very thing for which a man prays, the rain in the season of drought, and the health in the season of sickness, and the safety in the season of danger, may take place, and all apparently by natural means.* Some there are who suppose that the entire use of prayer is the indirect effect, the reflex influence that it has upon our minds, by making us more submissive, and more patient, and more humble, but that we are not to expect a direct and immediate answer. But surely this is not the nature of prayer as revealed in the Bible. There we are told to come to God as children to a father, and are assured that whatever we ask we will receive; in short, that at the throne of grace God condescends to meet us,

* These interpositions of Providence may also be brought about by the surprising conjunctions of circumstances. An earthquake, for example, may be considered simply as a natural phenomenon; but its occurring at the very spot where Korah and the rebellious Israelites had pitched their tents, is a proof of a special interposition on the part of God. And although in this instance the interposition is so marked that it may justly be denominated miraculous, yet conjunctions of circumstances equally surprising and equally remarkable have frequently occurred. "Herein," says Isaac Taylor, "is especially manifested the perfection of divine wisdom, that the most surprising conjunctions of events are brought about by the simplest means, and in a manner that is perfectly in harmony with the ordinary course of human affairs. This is, in fact, the great miracle of Providence, that no miracles are needed to accomplish its purposes."

even as an earthly benefactor his fellowmen; and that, as we can influence and persuade man by our prayers, so much more can we influence and persuade God, the most benevolent and liberal of beings.

To conclude, we have seen that although geology does not countenance the notion of development, yet it discloses a system of progression by which a higher order of beings succeeds a lower; the dynasty of fish has been succeeded by the dynasty of reptiles, and the dynasty of reptiles has been succeeded by the dynasty of quadrupedal mammals, and the dynasty of quadrupedal mammals has been succeeded by the dynasty of man.* Man now appears on this earth as the highest of created beings; he is constituted the lord of the inferior creation. "All things are put in subjection under his feet; all sheep and oxen; the beasts of the field, the fowl of the air, and the fish of the sea." There is a great gap between him and the highest of the inferior animals, greater than that which exists between one animal and another. But has creation now reached its ultimate state of perfection? Will the dynasty of man not give place to something better, and be succeeded by a higher and nobler dynasty? Analogy suggests that creation is progressive, and that the future will yet disclose a higher order of being. And what analogy suggests, Scripture appears to confirm. We are there told that redeemed man shall be glorified and advanced to a state of perfection, which shall, in all probability, excel our present condition, as much as our present condition excels that of the inferior animals. "We learn," observes Hugh Miller, "that the dynasty of man, in the mixed state and character, is not the final one, but that there is to be yet another

* The reader need not be informed that the phraseology here employed is that of Hugh Miller.

creation, or, more properly, re-creation, known theologically as the resurrection, which shall be connected in its physical components, by bonds of mysterious paternity, with the dynasty which now reigns, and be bound to it mentally by the chain of identity, conscious and actual: but which, in all that constitutes superiority, shall be as vastly its superior as the dynasty of responsible man is superior to even the lowest of the preliminary dynasties."*

We are informed in Scripture, that the present system will be destroyed by fire, that "the earth and the works that are therein shall be burnt up." But no annihilation will result from such a conflagration; out of the ruins of the old world, a new world will spring into existence. "Nevertheless," adds the apostle, "we, according to his promise, look for new heavens and a new earth wherein dwelleth righteousness." We dare not affirm, as many theologians have done, that this world renovated will be the abode of immortal and redeemed men; but from various passages of Scripture, and several analogies in nature, there seems a probability that such may be the case. Then will creation be advanced to a far higher perfection than at present; then will man be raised to a far higher state of glory and dignity; then will his moral and intellectual and corporeal natures be exalted and purified. "It doth not yet appear what we shall be." A purely intellectual being,

* MILLER'S "*Footprints of the Creator:*" 2d edition, p. 301. We would earnestly recommend this work to the reader. Like all the other works of Hugh Miller it is a work of genius; there is in it a wonderful command of the English language, and the reasoning is strong and forcible. Three chapters near the beginning are however nearly unintelligible, except to those acquainted with palæontology and comparative anatomy. The other portions of the work are perspicuous; but upon the whole this is the most technical, and on that account the least popular work of that great and good man.

such as an angel, could not, in all probability, tell what higher order of corporeal creatures would succeed that of the quadrupedal mammalia; nor can we form any idea of wherein will consist the superior excellence and dignity of redeemed men.* This is the kingdom of Christ; that kingdom, the subjects of which are all righteous, and who shall enter upon a course of progressive improvement throughout the ages of eternity.

The late Hugh Miller, in his "Footprints of the Creator," draws another striking analogy from the lessons which geology teaches us. He has observed, that whilst there is an advance of being in general, there is a degradation of particular orders—the fish, the reptiles, and the mammalia have all degenerated from what they once were in past geological ages. So, he observes, it will be to a considerable extent with the human race. Being will advance in the order of redeemed men; but at the commencement of this dynasty "there will be a re-creation of not only elevated, but also of degraded beings—a re-creation of the *lost*." Perhaps the analogy is overdrawn, but still it is striking, and the fact which it is thought to shadow forth is true. The human race shall be divided into two great classes—the class of the saved and the class of the lost—between whom a great moral gulf will be fixed, and that gulf will widen throughout eternity. It depends upon ourselves to which of these two classes we will belong; our eternal destiny is committed to our care; it relies upon ourselves whether, in a future life, we will

* The comparison is not here stated sufficiently strongly; it should be thus: even as the quadrupedal mammals of the Tertiary, supposing them capable of reasoning, could form no idea of the higher dynasty of man which was to succeed them; so no more can we form any conception of the still higher dynasty of redeemed man which shall succeed us.

be elevated or degraded beings. Let us make religion the great duty of our lives; let us seek to obtain an interest in Christ, and in the benefits of that redemption which He has procured for us; and thus, by an habitual reliance on the merits of the Saviour, a cultivation of the virtues of the Christian character, and a patient continuance in well-doing, let us seek after glory and honour and immortality.

CHAPTER IV.

THE MOSAIC DAYS.

The sacred Scriptures open with a description of the creation and arrangement of the universe—a description which, for the union of simplicity of diction with sublimity of thought, is probably unequalled by any composition. The first sentence contains a comprehensive statement of the creation of the universe. It reveals God to us, as the Creator of heaven and earth, the great First Cause, the Source and Origin of all existence. And there is a majestic simplicity in the narrative of the several acts which follow. "And God said, Let there be light; and there was light." The simple word of Jehovah is alone sufficient to produce the required effect; He has only to speak, and the work is done; to command, and all things stand fast. What a contrast is there between this account of creation by Moses and the heathen cosmogonies! Although sometimes admired by ingenious men, yet they are in reality mere childish tales, mere fabulous inventions, destitute alike of philosophic truth and probability to recommend them. The religions of the heathen are inseparably connected with the teachings of a false science; these constitute part and parcel of their doctrine; and therefore their falsehood is a sufficient reason to cause the claims of those religions to a divine origin to be rejected. But

there is nothing of this kind in Scripture; it does not profess to teach scientific truth; the facts of science constitute no part of its theology; and when it does touch upon natural phenomena, it is to illustrate religious truth, and to render it intelligible to the people to whom the revelation was given.

Hence, then, the truth of revelation does not depend upon the philosophical truth or falsehood of the scientific facts which it is supposed to contain, because these facts constitute no part of the revelation, but are merely illustrative; although we believe that the scriptural language, when properly interpreted, will be found, not to be contradicted, but elucidated by the modern discoveries of science. Whereas it is very different with heathen religions; the scientific facts contained in them constitute an essential part of their theologies. Perhaps the account of the creation of the world may by some be considered as an exception to this remark, but, so far as we know, it is the only exception; and the contrast between it and the absurdities of the heathen cosmogonies is most apparent. "These follies," (the heathen cosmogonies,) observes Dr. King, "even when dressed out in all the fascinations of learning and eloquence, make a poor figure beside the first chapter of Genesis—simple, grave, majestic, as we could desire any narrative to be, having God for its Author, and Providence for its subject."*

In this chapter we propose to consider the six creative days, as recorded by Moses in the first chapter of Genesis; to contemplate them in the new light which geology affords; not to force them into an agreement with the doctrines of that science, but to endeavour, according to the principles of a sound philology, to find out, if possible, their true meaning; and although we may be unable to discover what is the

* King's "*Geology and Religion*," pp. 83, 84.

true principle of reconciliation, yet to prove at least, that in the Mosaic narrative of creation, there exists no real discrepancy between the facts of science and the statements of revelation.

Now, it is freely admitted that this is a subject of great difficulty. It is with regard to the six creative days, and not with regard to the age of the world, that the real problem of harmonizing the narration of Moses with the discoveries of geology consists. Scripture does nowhere assert the age of the world; it leaves this matter entirely undetermined; it states the time of creation indefinitely as "in the beginning," and thus affords ample room for the cycles of geology. But, on the other hand, it does assert that the earth was put into its present form in the space of six days, that each day had its peculiar work, and that at the end of that period the whole was perfected and finished. Now there are, it is not to be denied, several geological difficulties which stand in the way of this account of creation, as commonly interpreted by us—some points in the harmony between Scripture and geology formerly advanced, which the late discoveries of science require should be re-considered and modified. These difficulties must not be shrunk from, but boldly met and encountered, being confident that Scripture shall suffer nothing from scientific discoveries. "Those are not the best friends of Christianity, who feel either dislike or alarm when the torch of science, or the torch of history, is held up to the Bible."

I. The first point to be ascertained is, What is the true nature of the language employed? Whether the description here given us by Moses is a poem, a vision, or a simple narrative? Until this is decided, we cannot proceed one step in the interpretation of the passage. Now there are several opinions on this point which merit our attention.

One theory, advanced by the Rev. Baden Powell, Savilian Professor of Geometry in Oxford, is, that the account given us by Moses is not to be considered or interpreted as a historical narrative, but that it is simply a "mythic poem," intended to teach the Israelites that the universe owes its existence to Jehovah; that this is the great germ of truth in the account, and that the other matters are merely accessories and embellishments.* "The one great fact," he observes, "couched in the general assertion that all things were created by the sole power of one Supreme Being, is the whole of the representation to which an historical character can be assigned. As to the particular form in which the descriptive narrative is conveyed, we merely affirm that it cannot be history—it may be poetry." Thus, then, according to this theory, the Mosaic account is not history, but mythic poetry. And we are no more to expect to find out a reconciliation between it and the facts of science, than we are to look for an exact agreement between Milton's "Paradise Lost" and the true history of the fall.

But such a theory is liable to very grave objections. It appears to us to be at variance with the notion of the inspiration of the Mosaic narrative; the knot is merely cut, it is not unloosened. Professor Powell admits the inspiration of Moses, and that he was the author or editor

* This theory was first advanced by Professor Powell in his "Connection of Natural and Divine Truth;" it is again brought forward by him in the article "Creation," in Kitto's "Encyclopædia of Biblical Literature," and more recently in his "Christianity without Judaism." The same hypothesis was advanced in a sermon of Professor Powell's, entitled, "Revelation and Science," and published at Oxford in 1833. The sermon is a most able one, and contains some very valuable observations, notwithstanding what we think the erroneous notions of the author on this particular point.

of the first chapter of Genesis; he speaks of Moses being "inspired to adapt and apply the narrative, borrowed, perhaps, from some poetical cosmogony, to the ends of religious instruction;" but it is not easy to see how this admission agrees with his theory, that the account of creation is a myth. Nor is there anything in the passage that would lead us to suppose that we have here merely a fictitious poem. The style is evidently historical, and not poetical; and its form is that of a plain narrative, and not of an instructive parable. "The whole," observes Dr. Pye Smith, "is in the style of plain narrative, evidently intended to be understood as a simple, straightforward, unadorned *history*. The dramatic form, introducing the Creator as speaking, to command an effect; and then stating that the effect followed, and that He was pleased with the contemplation of it, is a part of *the great characteristic* which runs through all the Hebrew Scriptures, and especially the earlier parts of them, the *Anthropopathia;* a mode of expression adapted, by the graciousness of the Divine condescension, to the capacity and habits of thought which belong to men in an unpolished state of society, who were totally ignorant of abstract phraseology, and would have been unable to receive spiritual sentiments, unless clothed in language borrowed from sensible objects, and from the emotions and actions of men."* But what especially leads us to reject this theory of Professor Powell, is, that if the account of creation be a myth, we have no guarantee for the truth of other portions of the books of Moses; the same mode of reasoning may be applied to them. And when once we admit the mythic principle, it is impossible to distinguish what is true from what is false in the account

* Smith's "*Scripture and Geology*," pp. 179, 180, Bohn's edition.

given us. Even although, then, we could see no way of solving the problem, yet so long as we hold the Mosaic account to be part of a divine revelation, we must not have recourse to the above hypothesis, which indeed solves the difficulty, but at the expense, as it appears to us, of inspiration; we must rather be content to remain in ignorance, believing, in the meanwhile, that there is no real opposition between science and revelation; but that the facts of the one, and the declarations of the other, are both founded on truth.

Another theory is, that the account given by Moses is the relation of what was revealed to him in vision, or in a series of visions—a description of what he saw in pictorial representations. This theory has been maintained under a variety of forms, and sometimes with considerable ingenuity. "If," says Dr. Knapp, "we would form a clear and distinct notion of this whole description of creation, we must conceive of six separate *pictures*, in which this great work is represented in each successive stage of its progress towards completion. And as the performance of the painter, though it must have natural truth for its foundation, must not be considered, or judged of, as a delineation of mathematical or scientific accuracy, so neither must this pictorial representation of the creation be regarded as literally and exactly true."* Similar theories of conciliation, with some variety in their details, have been advanced by other writers: in particular by Dr. Kurtz in Russia,† and by Mr. Sime in our own country, in his "Mosaic Record in Harmony with the Geological." But, in all probability, this theory would have been forgotten, or given up as

* See KNAPP'S "*Lectures on Christian Theology*," vol i., p. 355-360.

† The theory of Dr. Kurtz is given at length by Mr. Miller, in his "Testimony of the Rocks."

untenable, had not Hugh Miller, in his last work, "The Testimony of the Rocks," given it the authority of his distinguished name, and embellished it with all the fascinations of his wonderful eloquence.* He supposes that the whole series of geological formations from the gneiss down to the tertiary were "revealed in a series of visions to Moses, as the successive scenes of a great air-drawn panorama." This theory, however, we think, must be relinquished, or at least greatly modified, by every one, who in his researches after truth is guided by the principles of a cautious philosophy. It derives the greater part of its plausibility from the imagination, rather than from the judgment. There is nothing whatever in the account given us by Moses, which would lead us to suppose that he was recording a description of a vision which he had seen: the language is that of a plain, simple, and unadorned narrative, and it is altogether irrelevant to adduce passages to prove that God often revealed His will to Moses by visions and pictorial representations, a fact which none denies; the present question being, is there anything in the passage or the context, that would lead us to infer, that the several acts of creation were placed before him in vision? Besides, as we shall afterwards endeavour to show, this theory leads to no satisfactory solution of the difficulty: as there is no strict resemblance between the order of creation as described by Moses, or, as they would say, as seen by Moses in vision, and the order as disclosed in the stratified rocks.

It is to be borne in mind that Scripture always describes natural phenomena, not according to their scientific reality, but according to the appearances which they present. It

* Miller's "*Testimony*," Lecture Fourth—"The Mosaic Vision of Creation."

is not the design of revelation to teach the truths of science: these are the objects of reason, and not of faith. Its great purpose is to reveal the will of God to us His creatures—to make known the riches of His grace through Christ Jesus to an apostate race. Hence, then, when Scripture touches upon natural objects, it is not as they really and scientifically are, but as they appear to us to be. Indeed, in all books, except those especially devoted to science, the same method is adopted. We speak of the rising and the setting of the sun, of the firmament of heaven, and of the changes of the moon. There is truth in all these descriptions, not scientific but optical truth. Thus in this first chapter of Genesis, natural objects are described as they would have appeared to a spectator, supposing that there was then such an one upon the earth. It speaks of the firmament which divides the waters which were under it from the waters which were above it: of the sun as the greater, and the moon as the lesser luminary, and the stars as subordinate to either, without any regard to their relative magnitudes. "The historian," observes Moses Stuart, in a work written expressly against geology, "everywhere speaks as an optical observer, stationed on a point of our world, and surveying from this the heavens and the earth, and speaking of them as seen in this manner by his bodily eye. The sun, and moon, and stars, are servants of the earth, lighted up to garnish and to cheer it, and to be the guardians of its times and seasons. Other uses he knows not for them; certainly of other uses he does not speak. The distances, magnitudes, orbicular motions, gravitating powers, and projectile forces of the planets and of the stars, are all out of the circle of his history, and probably beyond his knowledge. Inspiration does not make men *omniscient:* It does not teach them the scientific truths of astronomy,

or chemistry, or botany, nor any science as such. Inspiration is concerned with teaching *religious* truths, and such facts or occurrences as are connected immediately with illustrating, or with impressing them on the mind. This is the object and extent of it: and to assume or suppose that it goes beyon assigning a placed this, is to it which it was never designed to fill."* And Calvin, who was ignorant alike of the discoveries of astronomy and of those of geology, in a remarkable passage expresses himself in similar terms, —"It is well again to repeat what I have said before, that it is not here philosophically discussed, how great the sun is in the heaven, and how great, or how little, is the moon: but how much light comes to us from them. For Moses here addresses himself to our senses, that the knowledge of the gifts of God which we enjoy may not glide away. Therefore, in order to apprehend the meaning of Moses, it is to no purpose to soar above the heavens; let us only open our eyes to behold this light which God enkindles for us in the earth. By this method the dishonesty of these men is sufficiently rebuked, who censure Moses for not speaking with greater exactness. For, as it became a theologian, he had respect to *us* rather than to the *stars*."†

Upon the whole, then, we conclude that the language employed by Moses, in his account of creation, is that of a real narrative. It is to be judged of as such, and to be examined by its accordance with fact. It relates what really took place, and not what was merely seen in vision, or what is merely stated to embellish a poem. It is true that there was no human eye upon the earth, to see and

* Moses Stuart's "*Philological View of the Modern Doctrines of Geology*," pp. 45, 46. Clark's edition.

† Calvin's "*Commentary on Genesis*," vol. i., p. 85, 86—Calvin Translation Society.

describe the several acts of creation which passed before it: but they are described, as they would have been seen and described by an individual, supposing that such an one was then alive upon the earth. The account was revealed to Moses, or to whomsoever was the narrator, by the inspiration of God, and it is a description of events which actually took place.

II. The second point to be determined is the meaning of the words *created* and *made*, so frequently employed in the sacred narrative of creation.

There are two different Hebrew words employed in the passage, and which are rendered by our translators, indiscriminately, created or made. The one word *bara* is a stronger term than the other, and is used in the first verse to denote the creation of heaven and earth: the other word *asah* is a weaker term, and is used in the fourth commandment to denote the making of heaven and earth in the space of six days. They correspond with our English words *created* and *made*. The second term appears always to denote a new arrangement of existing materials, rather than a proper creation from nothing: but even the first term, as the word *created* with us, is indefinite, and its sense can only be determined from the meaning of the passage in which it occurs.*

It would be superfluous to repeat the proofs which geology affords of the existence of the earth long anterior to the period of the creation of man. This is a demonstrated

* The term *bara* is employed, not merely to denote the original creation of heaven and earth, but also the formation of man out of the dust of the ground. (Gen. i. 27.) In the first verse it evidently denotes a bringing into existence, a creation out of nothing, and not a mere arrangement of previously existing materials: for in the second verse we read that the earth, which had been created, was without form and void.

fact of science, which can now neither be doubted nor called in question. Certainly, thousands, and in all probability, millions of years before man was created, this world existed, and was the abode of living creatures. But what we would here observe is, that this is in entire harmony with the Mosaic record of creation. The first verse of Genesis stands forth as an independent proposition, and asserts the time of creation indefinitely, as "in the beginning." There is from Scripture no reason to object to the intervention of ages between this original creation and the arrangement of the earth, in its present form, in the space of six days.

The only plausible objection which has been brought against this view of the subject, is the force of the connecting particle *and*, which unites the first with the second verse of Genesis, and from which it is inferred that there is an immediate sequence: "In the beginning God created the heaven and the earth. And the earth was without form and void." But there is here no order of sequence laid down; the particle here rendered *and* is merely the connecting particle of the Hebrew language, which, however, does not determine the mode of the connection. "It may be copulative, or disjunctive, or adversative; or it may express a mere annexation to a former topic of discourse, the connection being only that of the subject-matter, or the continuation of the composition. This continuative use forms one of the most marked peculiarities of the Hebrew idiom; and it comprehends every variety of mode in which one train of sentiment may be appended to another."* Hence, then, the value and meaning of this particle is extremely manifold, and it may be very differently trans-

* Smith's "*Geology and Scripture*," page 248. Bohn's edition.

lated in various passages. In our English translation it is usually rendered by the copulative conjunction *and*, but this is not always the meaning which is there given to it. It is also frequently rendered by the conjunctions *but, now, thus, also*, &c. In the passage under consideration, it has been differently translated by learned critics. One meaning given to it, which has met with the most favourable acceptance among biblical scholars, is that of the elder Rosenmüller, who renders it by the particle *afterwards:* "In the beginning God created the heaven and the earth: afterwards the earth was without form and void." If this be the true translation, the passage not only allows, but demands a period intervening between the creation of heaven and earth, and the chaos to which the earth was reduced.*

We conclude, then, that the terms rendered *created* or *made* in the Mosaic description of the six days' work, exclusive of the first verse, signify, not the original creation of all the things there mentioned out of nothing, but a new arrangement or remodelling of previously existing materials. This must be the true meaning of the terms independently of the deductions of geology, or the views which we may take of that science. No one now, since the discoveries of astronomy, can believe that the sun and moon and stars were created out of nothing less than

* Pye Smith remarks that to go no farther than the first two leaves of the Hebrew Bible, we find this copula rendered in our authorized version by *thus*, *but*, *now*, and *also*. Dr. Dathe of Leipzig, renders the first two verses in this manner—"In the beginning, God created the heaven and the earth. But afterwards the earth became waste and desolate." "The general sense of the verse," says Moses Stuart, "would not be materially injured by translating it thus—'afterwards the earth was without form.'" Upon the whole, we regard the objection as very trifling: even our own conjunction "and" does not always signify immediate sequence.

six thousand years ago, and yet the making of these is described as being a part of the fourth day's work. In the first day, we read of light being called into existence: at that period, the sun must have existed, and therefore even those who suppose that indefinite periods are denoted by the term *days,* must grant the existence of the sun before the fourth day. Matter, then, was created out of nothing "in the beginning,"—at some far distant period in the past. Then the heaven and the earth were called into existence. This world, we know from geology, was the abode of different creations for ages upon ages before the creation of man. To this fact of science there is nothing at variance in the sacred Scriptures. Afterwards, in the space of six days, the world was put into its present form: its materials were re-arranged; its form was readjusted; and it was constituted the abode of man. It is in this sense that we understand the declaration of the fourth commandment. "In six days the Lord made (*asah*) heaven and earth, the sea, and all that in them is"—that is, did not *create* them out of nothing, but *made* or arranged them in their present form.

III. Our third inquiry is, What is the meaning of the term *day* in the description by Moses of the six creative days? Now, there are here two views, each of which has been adopted and defended by learned men: some regard the six days of creation as periods of indefinite length, and others consider them as natural days.

The theory of indefinite periods, as it has been termed, was formerly maintained by several distinguished geologists, when the science of geology was not in so advanced a state as at present; and after having been for a time abandoned, it has recently been revived and maintained with much ingenuity and ability. The distinguished

naturalist and geologist Cuvier was an advocate of this theory; such also was the opinion of De Luc, Parkinson, and Professor Jamieson of Edinburgh; and in more recent times, the same theory has been advanced by Professor Silliman of America,* and appears to be maintained by the Rev. Dr. Anderson of Newburgh in his interesting and instructive work, "The Course of Creation." This theory proceeds upon the assumption that the days of the Mosaic creation are not to be understood as natural days, embracing only twenty-four hours; but as indefinite periods, each embracing, it may be, a million of years. Abundance of time is thus afforded for the various geological creations; for, according to this opinion, the world was in existence for five long periods before the sixth day, when man was created.

The above theory has lately come into great notoriety and favour, by its being adopted and defended by Hugh Miller, in his last most able work. He takes the three great palæontological divisions into which geology is arranged, and assigns to each of them a creative day, although the days are not taken in their order, the fourth day being omitted. "The geologist," he observes, "in his attempts to collate the divine with the geological record, has only three of the six periods of creation to account for, —the period of plants, the period of great sea-monsters and creeping things, and the period of cattle and beasts of the earth. He is called on to question his systems and formations regarding the remains of these three great periods, and of these only. And the question once fairly stated, what, I ask, is the reply? All geologists agree in

* Professor Silliman advances this view of the subject in a treatise on the Consistency of Geology with Sacred History, published in 1833 as a supplement to the American edition of Bakewell's "Geology."

holding that the vast geological scale naturally divides into *three* great parts. There are many lesser divisions,—divisions into systems, formations, deposits, beds, strata: but the master divisions, in each of which we find a type of life so unlike that of the others, that even the unpractised eye can detect the difference, are simply three—the Palæozoic or oldest fossiliferous division; the Secondary or middle fossiliferous division; and the Tertiary or latest fossiliferous division."* The first, or Palæozoic division, chiefly represented by the Carboniferous system, he refers to the third day; the second, or Secondary division, chiefly represented by the Lias and Oolite, he refers to the fifth day; and the third, or Tertiary division, represented by the Tertiary periods, he refers to the sixth day. In another chapter of the same work, he carries his theory still farther, and assigns to each day a particular geological system or formation. "These (geological days) may be named in their order as, *first*, the Azoic day or period; *second*, the Silurian and Old Red Sandstone day or period; *third*, the Carboniferous day or period; *fourth*, the Permian and Triassic day or period; *fifth*, the Oolitic and Cretaceous day or period; and *sixth*, the Tertiary day or period."†

As is evident, from the above quotations, the advocates of this theory have endeavoured to support it by *geological arguments*. They suppose that the order of creation, as described by Moses, corresponds with that developed by geology. At first, the earth was in a fluid state, covered with a sea and without inhabitants; then, on the third day, plants were created, answering to the abundant vegetation of the Coal measures; on the fifth day, the waters brought forth moving creatures, answering to the gigantic reptiles of the Lias and Oolite; on the sixth day, the beasts of the

* Miller's "*Testimony of the Rocks*," pp. 134, 135. † Ibid, p. 175.

earth were created, answering to the mammalia of the Tertiary; and last of all, man was called into existence.* The resemblance, however, between the order of creation as developed by geology, and that laid down in Scripture is more fanciful than real; at least no such order can be discovered on an examination of the stratified deposits. According to Genesis, plants were created on the third day, and animals not until the fifth: but, according to geology, animals and plants are discovered together as contemporaneous in the lowest fossiliferous strata; and numerous formations had passed away, long cycles of ages had elapsed, before the Carboniferous system was deposited; the trilobites of the Silurian and the fish of the Old Red Sandstone existed before the flora of the Coal measures. We are also told that the sun did not appear until the fourth day, a statement perfectly in accordance with the idea that the days are natural periods; but at variance with the theory of indefinite periods, which would suppose that, for long preceding ages, the sun had never once shone upon the earth.† Besides, according to this theory, Moses describes not the creation of present plants and animals which now exist, but of those which have for ages been extinct; for not a single plant of the Carboniferous system, not a single animal of the Oolite now survives. But who can admit the truth or probability of this? Why should Moses describe

* Cuvier asserts that "the cosmogony of Moses assigns to the epochs of creation precisely the same order as that which has been deduced from geological considerations:" and Professor Jamieson of Edinburgh has endeavoured to exhibit the correspondence in detail.

† Birds are mentioned as having been created on the fifth day, that is, according to this theory, during the deposition of the Lias and Oolite; but very few of their remains are found in the fossiliferous rocks. Their footprints have been discovered in the Triassic; and it is not until we reach the Eocene beds of the Tertiary that their bones have been found.

the creation of extinct species, and pass entirely over those which now exist, and which alone are connected with man?

The advocates of this theory have also attempted to support it by *philological arguments.* The word *day,* they observe, is an indefinite term; it is often, in Scripture and in common language, used to express a period of vast duration; we speak of the day of grace, the day of salvation, the day of human life; there is then no philological necessity of restricting the term to a duration of twenty-four hours. But this argument appears to us to be wholly irrelevant. It is very true that the word *day* is an indefinite term; that it often signifies a period of long duration; we admit all that is demanded on this point; but what is gained thereby? The question is not, What is the meaning of the term in other passages? but, What does it mean here? Now we cannot see how it can be more plainly affirmed to mean a natural day. In every one of the creative days the Scripture speaks of a morning and an evening.* And besides, we have, in this very passage, a definition of the term day, which corresponds only with the supposition that a natural day is meant. "And God called the light Day, and the darkness He called Night." But what especially leads us to believe that the days of the Mosaic account are natural days, and not long periods, is the reference to the creative days in the fourth com-

* The advocates of the theory of indefinite periods endeavour to found an argument on Gen. ii. 4, "These are the generations of the heavens and of the earth when they were created, in the day that the Lord God made the earth and the heavens." Here, they observe, the term day is used figuratively. But, as Dr. Smith remarks, "The word used in this place is not the simple noun: but it is a compound of that noun with a preposition, formed according to the genius of the Hebrew language, and producing an adverb, requiring to be rendered by such words as *when, at the time, after.*"

mandment: "Six days shalt thou labour and do all thy work. For in six days, the Lord made heaven and earth." Now, according to the above hypothesis, these two periods of six days are very different; the first is a period of six natural days, but the second is a period of indefinite magnitude, in all probability six millions of years. But surely it is against all the principles of sound criticism to give two such different meanings to the same word, in the same passage, unless there be something in the construction of the passage itself which necessitates the difference. It is true, that the advocates of the above theory endeavour to surmount the objection by conceiving the Sabbath or seventh day itself to be a long period—the period of redemption; and that the fourth commandment teaches us, that as God created the heaven and the earth in six periods and rested on the seventh; so should we work during six periods and rest the seventh, and that the proportion between these periods depends on the difference between the natures of God and man. But such an interpretation is evidently unnatural, and made only to suit a preconceived hypothesis.

For these reasons, and for others that might be assigned, we conclude that the term *day* does not mean an indefinite period. Both the discoveries of geology and the principles of philology seem to us to be opposed to such a meaning being assigned to it. We are led, then, to believe that by days here are meant natural days—successive periods of twenty-four hours. This is evidently the obvious and natural meaning of the term *day* in the passage under consideration; the other interpretation is forced and unnatural. At the same time, we give this opinion with diffidence, and are far from asserting positively that the theory of indefinite periods is erroneous; on the con-

trary, we fully concur in the remarks of Dr. Hitchcock, who, after summing up the arguments for and against the above theory, observes, "Geologists and theologians, for the most part, prefer to regard the six days as literal days of twenty-four hours. But, generally, they would not regard the opposite opinion to be as unreasonable as it would be to reject the Bible from any supposed collision with geology."*

IV. In the fourth place, another very important word remains to be considered, What is the meaning of the term "*earth*" in this connection? Now here also there are several opinions, which require to be discussed.

A very common theory, once almost universally adopted by biblical geologists, and still resorted to by men of great eminence, as the solution of the difficulty, is that by *earth* here is meant the whole world—the entire globe. This was the opinion which Dr. Buckland advanced, although with diffidence, in his "Bridgewater Treatise," and which Dr. Chalmers adduced as his solution of the geological problem.† According to the distinguished advocates of this theory, the world, which had for indefinite ages previously existed, was brought into a state of disorder or

* Hitchcock's "*Religion of Geology*," p. 67.

† "The detailed history of creation in the first chapter of Genesis," says Dr. Chalmers, "begins at the middle of the second verse; and what precedes might be understood as an introductory sentence, by which we are most appositely told, both that God created all things at the first, and that afterwards, by what interval of time it is not specified, the earth lapsed into a chaos, from the darkness and disorder of which the present system or economy of things was made to arise." So also Archbishop Sumner expresses himself in similar terms. "We are not called upon to deny the possible existence of previous worlds, from the wreck of which our globe was organised, and the ruins of which are now furnishing matter to our curiosity."—Sumner's "*Records of Creation*," vol. i., pp. 284, 285.

chaos, immediately before the creation of man; all former creations of plants and animals were destroyed; and in the space of six days the earth was reduced to its present form, according to the order laid down by Moses, furnished with an entirely different and new creation, and constituted the abode of man. According to this theory, there was a universal chaos, a total extinction of previously existing plants and animals, and an entirely new creation, an introduction of a completely different set of creatures. "The first evening," observes Dr. Buckland, "may be considered as the termination of the indefinite time which followed the primeval creation announced in the first verse, and as the commencement of the first of the six succeeding days, in which the earth was to be fitted up, and peopled in a manner fit for the reception of mankind. We have, in this second verse, a distinct mention of earth and waters, as already existing, and involved in darkness; their condition also is described as a state of confusion and emptiness, (*tohu bohu*), words which are usually interpreted by the vague and indefinite Greek term, *chaos*, and which may be geologically considered as designating the wreck and ruins of a former world. At this intermediate point of time, the preceding undefined geological periods had terminated, a new series of events commenced, and the work of the first morning of this new creation was the calling forth of light from a temporary darkness, which had overspread the ruins of the ancient earth."* This theory was advanced at a period when the science of geology was comparatively in its infancy; it, at the time, came in conflict with no geological facts, and was perfectly adequate to reconcile the Mosaic narrative with the disclosures of science. But,

* Buckland's "*Bridgewater Treatise*," vol. i., pp. 23-26.

since that period, farther discoveries in geology have been made, which must cause this theory to be greatly modified, if not entirely abandoned.

Although there has been a great variety of geological creations, yet the point at which geology at present tends, is, that there never has been a complete break in the chain of existence—that these creations are connected together, so that a few of the species of one formation have passed into that which succeeds it. This, indeed, is not yet fully demonstrated; there still appears to be an almost entire break between the Permian and Triassic formations,* and between the Cretaceous and the Tertiary. But be this as it may, it is certain that there is no break between the present formation and the Tertiary or those strata which immediately preceded it. Many of the previously existing plants and animals, instead of being destroyed, have come down to our day. Indeed, the whole series of the Tertiary periods are arranged according to the greater or lesser number of existing shells which they contain. According to Sir C. Lyell, the numerical proportion of existing to extinct shells in the different Tertiary periods is 3½ per cent. in the Eocene period, 17 per cent. in the Miocene period, from 35 to 50 per cent. in the older Pliocene period, and even as great as from 90 to 95 per cent. in the newer Pliocene or Pleistocene period.† Nor is it only shells which have existed before the Adamic creation, but several of the present species of plants and animals.

* The Permian formation is the end of the Palæozoic, and the Triassic is the beginning of the Secondary period; and Professor Ansted tells us that, "between the close of the older epoch and the commencement of this (the Triassic) every species, both of animal and vegetable, almost without exception, seems to have been changed."—"*Ancient World*," p. 112.

† Lyell's "*Manual of Geology*," p. 116, fifth edition.

Of plants, Hugh Miller, in his "Testimony of the Rocks," mentions the common Scotch fir, the common birch, the common oak, and the Norwegian spruce; and of animals, he mentions the goat, the badger, the fox, the wild cat, and the red-deer, as having existed thousands of years before man was created. There is no break of existence, no chaos of death, between them and the present creation.

Thus, then, there was no such universal chaos over the whole world, immediately before the Adamic creation, as consisted in the entire extinction of all previously existing plants and animals; for it is contrary to all analogy to suppose, that God would re-create precisely the same organic forms. "It is," says Hugh Miller, "a great fact, now fully established in the course of geological discovery, that between the plants which in the present time cover the earth, and the animals which inhabit it, and the plants and animals of later extinct creations, there occurred no break or blank, but that, on the contrary, many of the existing organisms were contemporary during the morning of their being with many of the extinct ones during the evening of theirs. We know farther, that not a few of the shells which now live on our coasts, and several of even the wild animals which continue to survive amid our tracts of hill and forest, were in existence many ages ere the human age began. Instead of dating their beginning only a single natural day, or at most two natural days, in advance of man, they must have preceded him by many thousands of years. In fine, in consequence of that comparatively recent extension of geologic fact in the direction of the later systems and formations, through which we are led to know that the present creation was not cut off abruptly from the preceding one, but that, on the contrary, it dove-tailed into it at a thousand different points, we are led also

to know that any scheme of reconciliation which would separate between the recent and the extinct existences by a chaotic gulf of death and darkness, is a scheme which no longer meets the necessities of the case."*

Accordingly, another scheme of reconciliation has been advanced, in order to remove this difficulty, by one who, more than any other man, united in himself the qualifications of an accomplished geologist and a profound theologian; we allude to Dr. Pye Smith. He supposes that by the term *earth* is not meant the whole, but a portion of the world; and he endeavours by philological arguments to prove that this is the meaning of the term in the Mosaic narrative of the six days' work.† "Considering," says he, "all the evidence of the case, I can find no reason against our regarding the word, subsequently to the first verse, and throughout the whole description of the six days, as designed to express *the part of our world which God was adapting for the dwelling of man, and the animals connected with him.*" And the narrative of the six days' work he considers to be "a description, in expressions adapted to the ideas and capacities of mankind in the earliest ages, of a series of operations, by which the Being of omnipotent wisdom and goodness adjusted and furnished not the earth generally, but, as the particular subject under consideration here, a portion of its surface, for the most glorious purposes." And this portion of the

* Miller's "*Testimony of the Rocks*," p. 121, 122.

† The eulogium which Dr. Hitchcock pronounces on Dr. Pye Smith is most just and merited. "We can say of him, what we can say of very few men, that he is accurately acquainted with all the branches of the subject. Eminent as a theologian and a philologist, and fully possessed of all the facts in geology and natural history, he gives us his opinion, not as a young man full of novelties, but in the full maturity of judgment and of years."—Hitchcock's "*Religion of Geology*," p. 122.

earth he conceives to have been "a part of Asia, lying between the Caucasian ridge, the Caspian sea, and Tartary on the north, the Persian and Indian seas on the south, and the high mountain ridges which run at considerable distances on the eastern and western flank." This portion of Western Asia, the cradle of the human race, he supposes "was by atmospheric and geologic causes of previous operation under the will of the Almighty, brought into a condition of superficial ruin, or some kind of general disorder." Afterwards, elevations of land took place, and in the course of six days, this district was prepared by a series of creative acts for the residence of man, and of the several plants and animals which are peculiar to that region.*

Such is an outline of the celebrated theory of Dr. Pye Smith. It has since been defended and illustrated by various writers.† We have not space to enter into its details. It has been advanced with great ingenuity, supported with much learning, and defended with remarkable candour and liberality. The restriction of the term *earth* to only a portion of the world is favoured by the fact, as is now agreed upon by the generality of biblical geologists, that a similar limitation must be given to the term in reference to the deluge. The reduction of a portion of the

* Pye Smith's "*Scripture and Geology*,"—p. 249-251. This work, however much we may differ from some of its assumptions, is of extraordinary erudition, ingenuity, and ability. The distinguished author appears to be equally at home in philology, theology, and geology. It is certainly the best work on Geology in its relation to Revelation.

† In particular, this theory forms the groundwork of a recent publication of much merit,—"Geology and Genesis, a Reconciliation of the two Records," by the Rev. George Wight. London: John Snow, 1857. Dr. Pye Smith's theory is here adopted and carried out to its legitimate consequences.

earth to a chaotic state is in itself by no means an improbable hypothesis; it is what must frequently have occurred in past geological ages; and even in modern times, we have an example of it in the effects produced by the eruption of Skaptar Jokul in Iceland, in the year 1783: and Mrs. Somerville tells us, that in that island there is "a low valley, a hundred miles wide, extending from sea to sea, which is a tremendous desert, a scene of perpetual conflict between the antagonistic powers of fire and frost, without a drop of water or a blade of grass; and where no living creature is to be seen, not a bird, nor even an insect."*

This theory of restricting the six days' creative work to a small portion of the earth, if otherwise admissible, certainly removes the geological difficulty which attaches itself to the other interpretation of the term earth. There is here ample space allowed for the previous existence of many of the present species of plants and animals; the scene of creation is restricted to one definite centre; and whilst it was reduced to superficial ruin and disorder, the world around it was the seat of animal life and enjoyment. We are not aware of any geological objections which militate against it; indeed, Hugh Miller, although on other grounds opposed to it, candidly admits that this scheme "certainly does not conflict with the facts educed by geologic discovery."†

Still, however, we are far from asserting, or believing, that this is the true key to the understanding of the Mosaic narrative—the true solution of the question. It seems to be a theory adapted to the present state of geological

* Mrs. Somerville's "*Physical Geography*," Vol. I. chap. 13. See also King's "*Geology and Religion*," pp. 108-110, fifth edition.

† Miller's "*Testimony of the Rocks*," p. 131.

science, but which may not stand the test of future discovery. In short, it is an hypothesis which requires confirmation; and, until this confirmation, we would hesitate to assert, that the term *earth* in the Mosaic narrative of creation denotes only a portion of the world. The description given us in the first chapter of Genesis, appears to be too magnificent and grand to admit of such a limitation to only a small portion of the earth, and to the creation of only a few species of plants and animals. And the phrase employed in the fourth commandment appears to be too universal an expression to admit of so restricted a meaning,—"In six days the Lord made heaven and earth, the sea and all that in them is."

There is still a third view of the term *earth*, which intervenes between the views of Dr. Buckland and Dr. Smith. This theory agrees with Dr. Buckland's, in supposing that by the term earth, is meant the whole world; but it differs from it in so far as it holds that there was only a partial, instead of a total destruction of previously existing plants and animals. Prior to the six Mosaic days, according to this theory, a geological convulsion or catastrophe took place, co-extensive with the earth, when, probably by igneous agency, a great revolution was effected; part of the dry land, it may be, having subsided below the level of the sea, and a portion of the bottom of the sea being elevated; and this was the state of chaos or confusion mentioned in the second verse of Genesis, where it is said, that "the earth was without form and void." But by this geological convulsion, is not meant that there was a total extinction of life, a destruction of all created beings; several animals and plants survived the convulsion, although perhaps by far the greater number, not only of individuals, but of species, were destroyed. In short, there

was here the termination of an old formation,—the end of a geological period. Afterwards, in the space of six days, the earth was put into its present form, and an entirely new creation of animals and plants was called into existence. There is nothing in the sacred narrative which would lead us to infer that such a creation was restricted to a particular place; there is nothing which prevents us supposing that there may have been various centres of creation. This new creation consisted in the present race of plants and animals, except those which had survived the geological convulsion. But what distinguishes and exalts it above all other geological creations is the introduction of man into the world,—a being formed in the image of God. This theory, then, whilst it meets the geological difficulty as to the existence of several of the living species before the Adamic creation, does not necessitate us, as in Dr. Smith's theory, to restrict the term *earth* to a small portion of the world.

It is to be observed that, in all probability, there have been numerous similar destructions and creations in past geological ages. Although it may be true that each formation is connected with the preceding, by having several species common to both, yet it is still more fully ascertained that each formation has a creation peculiar to itself. At or toward the close of one formation, there must have been a considerable destruction; at or after the beginning of the next formation, there must have been an entirely new creation.* An example will best illustrate what is meant.

* Such a statement, however, it is to be observed, would, in all probability, be denied by Sir C. Lyell and the Uniformitists. According to them, the introduction of new species was gradual. This, however, is contested by Professor Sedgwick and other distinguished geologists. Professor Hitchcock observes, "that a new creation occurred at the commencement of the several geological periods can hardly admit of a doubt."

There are a few species discovered which are common to the Old Red Sandstone formation and the Carboniferous system; but still each has a creation peculiar to itself; there are characteristic fossils which never penetrate from the one into the other; when, then, we pass from the Old Red Sandstone to the Carboniferous system, we find an extinction of numerous species, and an entirely new creation of other and different species. There is here, then, what we may, for want of a better term, call a geological catastrophe; a chaos or extinction on the one hand, and a creation or renovation on the other; the fish of the Old Red Sandstone have been succeeded by the fauna and flora of the Carboniferous system. Professor Sedgwick, perhaps the most cautious of our English geologists, informs us, that the changes of the forms of organic life appear to have been contemporaneous with changes in the physical world. "The greatest changes of organic types," he observes, "among our strata *are* connected with *physical revolutions*." And Elie de Beaumont supposes that "in the history of the earth, there have been long periods of comparative repose, during which the deposition of sedimentary matter has gone on in regular continuity; and there have also been short periods of paroxysmal violence, during which that continuity was broken." "The appearance of mountains," remarks Agassiz, "and the inequalities of the surface resulting from it, seem to have coincided generally with the epochs of the renewal of organized beings." So, according to this theory, in a precisely similar manner, although there are several species common to the upper Tertiary and the present period, yet each has a creation peculiar to itself; there is an extinction of many of the Tertiary species, and an entirely new creation of many of the existing species; we pass from an old to a new geological

formation; there is a catastrophe or convulsion at the end of the one, and a new creation at the beginning of the other. Man and the greater number of existing species were created at the period assigned by Moses.

It is argued by an influential school of geologists, that the laws of nature have ever been uniform, that the changes upon the earth's surface have never upon the whole been much more violent than they are now, and that geological catastrophes or convulsions are chimerical. With the profoundest deference for Sir Charles Lyell, as perhaps the most distinguished of living geologists, we cannot but think that he has carried his theory of uniformity to an unwarrantable extent. We have little sympathy with the views of the old catastrophists, but still we regard a middle view as the correct one, that whilst the laws of nature have upon the whole been uniform in their action, yet that at certain periods there have been what may be called geological catastrophes,—partial destructions of existing species, and entirely new creations. This hypothesis has been adopted by Elie de Beaumont. "Each revolution, or as it may be termed, frightful convulsion," he remarks, "has fallen in with the date of another geological phenomenon; namely, the passage from one independent sedimentary formation to another, characterized by a considerable difference in organic types." Such appears to us the only theory accounting for the marked differences in the organic forms of different formations. Between the close of the Permian and the commencement of the Triassic formation, "every species, both of animal and vegetable, almost without exception, seems to have been changed."* A similar almost entire break of existence occurs between the

* Ansted's "*Ancient World*," p. 112.

end of the Chalk formation and the commencement of the Tertiary periods. At the end of the Permian and of the Chalk there is also abundant evidence of the most extensive and violent igneous action. Here, then, are two examples of what, to say the least, are very like catastrophes,—almost entire extinctions on the one hand, and entirely new creations on the other.

It is further argued by the advocates of this theory, that there is evidence of such a geological convulsion at the close of the Tertiary formation. Not only was there an entire extinction of many of the then existing species, but a great alteration of the surface of the earth. An immense change in the temperature took place, at least in northern and high southern latitudes. A comparatively warm climate was succeeded by the temperature of the frozen zone. The land in Scotland is supposed to have sunk from one to two thousand feet. Icebergs and glaciers abounded. The immense boulders, which are found in this country, are evidences of the intensity of the cold, and of the power of the forces in operation. It was, as an eminent geologist terms it, an age of extinction. "All this while," he observes, "both the land and the water seem to have been, for the most part, destitute of inhabitants." How long this drift period continued, geologists have not ascertained; but it is certain, that it intervenes between the uppermost Tertiary and the present formation. "It seems," says Dr. Hitchcock, "that a time was chosen for its operation when the globe was almost destitute of organic life, and not long before the time when a new and nobler creation than those previously occupying the earth was to be placed upon it."* The advocates of the above theory do not venture to affirm

* Hitchcock's "*Religion of Geology*," pp. 172, 173.

positively that this is the chaos mentioned in Scripture; but still here, at a period comparatively recent, we have a season of destruction, and at its close another mighty revolution, when the present land was raised, and the earth was put into its present form.

We are, however, by no means prepared to affirm that the theory, which would identify the creation of Genesis with a new geological era, is a true and satisfactory solution of the difficulty. Like the theory of Dr. Pye Smith, it is an hypothesis which deserves candid discussion and confirmation, or else refutation. One great objection to it is that the number of existing species found in what are supposed to be deposits of the newer Pliocene period, and therefore pre-Adamic, is very large. And farther, there are appearances, such as elevated beaches and coast lines, deltas, channels of rivers, &c., that seem rather to favour the idea of a period of rest than of disturbance, immediately before the Adamic creation. We have seen that Sir Charles Lyell estimates the time taken by the Niagara in excavating its channel at thirty thousand years, and the time taken by the Mississippi in forming its delta at a hundred thousand years. Similar calculations have been made by him and other distinguished geologists from the inspection of other natural phenomena. In short, we are, as yet, too ignorant of the nature of the drift period to assert any thing positive on the subject.

For this reason, we regard all attempts at the discovery of an adequate theory of reconciliation, for the present, hopeless. Geology, as a science, does not appear to be in that state of advancement which would enable us to apply its deductions to the Mosaic narrative; there are still several data wanting; we are, in particular, ignorant of the period immediately preceding the present, and therefore of those

facts, which it is essential to know, before we can form any satisfactory theory. There is avowedly among geologists an ignorance as to the precise state of the earth, immediately before the present creation; that part of the geological record, so to speak, is written with strange characters, and is hardly legible. Until, then, we are able to know, with some degree of certainty, the geological condition of the earth immediately before the creation of man; it is, we think, impossible to assert, whether the account given by Moses agrees or disagrees with the facts of geology.

Upon the whole, the matter must still be left in considerable doubt. Biblical geologists are not in a position to attain to a full and perfect theory. They have been employed rather in removing difficulties and destroying false theories, than in advancing any thing positive on the subject. And there is much truth in the remark of Professor Sedgwick, that Biblical geologists "have prematurely, and, therefore, without an adequate knowledge of all the facts essential to the argument, endeavoured to bring the natural history of the earth into a literal accordance with the book of Genesis."* "Geology," observes, Dr. King, "is but feeling its way to the formation of a complete and coherent system. If in its present state it exhibited an apparent accordance with our interpretation of Scripture, new difficulties might arise from subsequent geological discoveries. It is enough for the present that apparent contradictions are becoming less prominent, while possible means of reconciliation are enlarging on the view."† And hence, we are still constrained to adopt the language of Dr. Buckland, however unsatisfactory such language may be to impatient minds: "It must be

* Sedgwick's "*Discourse*," Appendix, p. 115. Fifth edition.

† King's "*Geology and Religion*," p. 107.

cordially admitted that the season has not yet arrived, when a perfect theory of the whole earth can be fixedly and finally established, since we have not before us all the facts on which such a theory may eventually be founded."*

It is, however, to be borne in mind, that our ignorance of the true method of reconciliation between the facts of geology and the statements of revelation, does not prove that there is any real discrepancy. Both the geological facts, when fully demonstrated, and the scriptural declarations, when properly interpreted, are founded on truth, and cannot possibly contradict each other. We believe that there exists a reconciling principle between them, although from want of data we may not be able to discover it. Meanwhile, our ignorance ought to teach us caution and patience, but ought not for a moment to lead us to imagine that there is any real contradiction between science and revelation. Some of the theories alluded to in this chapter do not, so far as we can discern, directly contradict either geology or Scripture; and should, therefore, teach us that there need be no irreconcilable discordance. We are far from affirming or believing, that any one of these theories is the true solution of the difficulty; we merely assert, that this much they demonstrate, that in the Mosaic narrative of creation, there need be no real discrepancy between the facts of science and the statements of revelation.

We need be under no apprehension that true science shall ever be opposed to revelation. The word of God is not contradicted, but illustrated and confirmed by His works. This has ever been the case in past ages; and this will ever be the case in the ages to come. Scripture does

* Buckland's "*Bridgewater Treatise*," p. 12.

not shrink from the strictest scrutiny, nor is it at all afraid that any discovery of science shall either weaken its evidence, or contradict its statements. In former ages, religious men were afraid that the discoveries of astronomy were at variance with Scripture, and in our days similar apprehensions have been occasioned by the discoveries of geology; the apprehensions to which the astronomical discoveries gave rise have long ago subsided, and astronomy has proved herself the handmaid of revelation; and the same, we believe, will be the issue of those apprehensions, occasioned by the geological discoveries; nay, we affirm, such already ought to have been their issue, had men but dismissed all unreasonable jealousy, and sought after the truth with candour, honesty, and patience. "It follows," says Dr. Pye Smith, "as a universal truth, that the Bible, faithfully interpreted, erects no bar against the most free and extensive investigation, the most comprehensive and searching induction. Let but the investigation be sufficient, and the induction honest; let observation take its farthest flight; let experiment penetrate into all the recesses of nature; let the veil of ages be lifted up from all that has been hitherto unknown, if such a course were possible;—religion need not fear, Christianity is secure, and true science will always pay homage to the divine Creator and Sovereign, 'of whom, and through whom, and to whom are all things; and unto whom be glory for ever.'"*

* Smith's "*Geology and Religion*," Bohn's Edition, p. 283.

CHAPTER V.

EXISTENCE OF DEATH BEFORE SIN.

One important point, on which the facts of geology are supposed to be at variance with the declarations of revelation, is the existence of death among the inferior animals before the fall of man. It is the common notion, that the inferior animals were made subject to death in consequence of the sin of man,—a notion which, we believe, is still often inculcated from the pulpit, as if it were derived from the word of God. And thus, according to this opinion, not only the death of man, but the death of all living creatures is mysteriously connected with the sin of Adam. Before the fall, it is supposed, that the inferior animals, like Adam, were endowed with immortality; pain and death were unknown; there were no venomous serpents or ravenous beasts; either carnivorous animals did not then exist, or their propensities were restrained, and they subsisted on the herbs of the field. Eden was the scene of unbroken harmony and peace, the wolf dwelt with the lamb, and the leopard with the kid. But sin marred all; no sooner had man fallen, no sooner had he stretched forth his hands and taken of the forbidden fruit, than a terrible change to the worse take place. The natures of the lower animals were altered; many became ferocious,—many which, before that event, were

herbivorous became carnivorous, and death for the first time entered the world. The balmy climate of Eden was also changed, the soil lost its fertility, and the beauteous flowers and rich fruits of paradise were exchanged for the thorn and the thistle.* The supposition is poetical, and highly pleasing to the sensitive mind which shrinks from suffering and pain. At first sight also, before the subject is attentively considered, it seems most agreeable to our notions of the beneficence of the Creator. And accordingly to it, without a due regard to their true meaning, these expressions of the apostle have been supposed to refer. "By one man sin entered into the world, and death by sin." "By one man came death." "In Adam all die." "The creature was made subject to vanity, not willingly, but by reason of Him who hath subjected the same in hope." "The whole creation groaneth and travaileth in pain together until now."

In this chapter we propose to consider this subject at length,—*The Existence of Death among the inferior animals before sin.* We shall attempt to show that this fact, ascertained by the discoveries of geology, is not at variance with the statements of revelation. We regard the opinion,

* Thus we find a modern author saying—"When both the beasts of the field and the cattle were brought into the garden to Adam, that he might give them names, the distinction between wild and tame animals would not exist. The change to the worse in the original natures of so many of the inferior animals was part of the curse which sin entailed on the world, and, probably, began to make its appearance very gradually, but was fully developed before the universal deluge."—"*The Creative Week*," p. 326. It was the opinion of Calvin, that the inferior animals were changed to the worse in consequence of the sin of Adam: and that, in particular, they lost their gentleness, and became savage and ferocious: although he does not positively assert, that they became carnivorous.—CALVIN'S "*Commentary on Genesis*," vol. i., pp. 132, 290. Calvin Translation Society.

that the inferior animals were subject to death because of sin, as wholly erroneous, as uncountenanced by Scripture, and completely contradicted by the discoveries of modern science.

In considering this subject, we shall, first, attend to the geological fact—that death did exist before sin: we shall, secondly, prove that this fact is not contrary to the statements of Scripture: and we shall, thirdly, endeavour to show that death, and even death by violence, among the inferior animals, is a benevolent dispensation.

I. The first point, then, is to inquire into the geological fact—that *death, as regards the inferior animals, did exist in this world before sin.*

Geology informs us that myriads of ages before man existed, animals lived and died. Their skeletons are found entombed in their rocky sepulchres. These fossil organic remains are so numerous, that whole rocks are almost entirely composed of them. The mountain limestone group is often completely filled with shells of particular forms, and by reason of the abundance of certain kinds, such as the encrinite and the producta, the limestones in which they are contained have been termed encrinital and producta limestones: the nummulitic limestone,* of which some of the pyramids of Egypt are constructed, is entirely composed of chambered shells; and the chalk and the tripoli are said to be only a conglomeration of microscopic shells. Other rocks, it has been proved, are entirely formed of an almost infinite number of fossil animalcules.† There

* The nummulitic limestone belongs to the Eocene period of the Tertiary formation: it often attains a thickness of many thousand feet. It is largely developed in the Alps, Pyrenees, and Carpathian mountains, as well as in the North of Africa.

† In the chalk, Mr. Lonsdale asserts that the microscopic shells are

are also numerous remains of fish and reptiles of a gigantic size. And not only are these animals, whose dead bodies are thus found in the rocks, entirely different from any which now exist, but there have been numerous systems of creation obviously distinct from each other. Here, then, is death in a gigantic scale. In surveying the different formations, we just pass from one platform of death to another. And, be it further observed, that many of these animals were carnivorous, and were provided with organs designed to enable them to destroy other animals—with powerful teeth, and sharp claws, and strong jaws, thus declaring, that ages before man was created death and death by violence was in this world.

We cannot resist the temptation of giving an extract on this subject from the "Testimony of the Rocks," that learned and eloquent work of the late Hugh Miller. The passage is long, but it is one of great eloquence, and exhibits the matter in a clear and forcible point of view.

"We are told by Goethe, in his autobiography, that he had attained his sixth year when the terrible earthquake at Lisbon took place,—'an event,' he says, 'which greatly disturbed' his 'peace of mind for the first time.' He could not reconcile a catastrophe so suddenly destructive to thousands with the ideas which he had already formed for himself of a Providence all-powerful and all-benevolent. But he afterwards learned, he tells us, to recognise in such events the "*God of the Old Testament.*" I know not in

unutterably numerous; in a cube of tripoli rock about one-tenth of an inch, 500 millions of shells are contained; in a cubic inch of the polishing slate of Bohemia, there are 41,000 millions of animalcules; and in an ounce-and-a-half of a particular stone in Tuscany, 10,454 microscopic shells were counted. For further information on the subject, see Buckland's "Bridgewater Treatise," Chap. xii.

what spirit the remark was made; but this I know, that it is the God of the Old Testament whom we see exhibited in all nature and all Providence; and that it is at once wisdom and duty in His rational creatures, however darkly they may perceive or imperfectly they may comprehend, to hold in implicit faith that the adorable Monarch of all the past and of all the future is a King who 'can do no wrong.' This early exhibition of teeth, and spine, and sting,—of weapons constructed alike to cut and to pierce,—to unite two of the most indispensable requirements of the modern armourer,—a keen edge to a strong back,—nay, stranger still, the examples furnished in this primeval time, of weapons formed not only to kill, but also to torture,—must be altogether at variance with the preconceived opinions of those who hold that until man appeared in creation, and darkened its sympathetic face with the stain of moral guilt, the reign of violence and outrage did not begin, and that there was no death among the inferior creatures, and no suffering. But preconceived opinion, whether it hold fast, with Lactantius and the old Schoolmen, to the belief that there can be no antipodes, or assert, with Caccini and Bellarmine, that our globe hangs lazily in the midst of the heavens, while the sun moves round it, must yield ultimately to scientific truth. And it is a truth as certain as the existence of a southern hemisphere, or the motion of the earth round both its own axis and the great solar centre, that, untold ages ere man had sinned or suffered, the animal creation exhibited exactly its present state of war,—that the strong, armed with formidable weapons, exquisitely constructed to kill, preyed upon the weak; and that the weak, sheathed, many of them, in defensive armour equally admirable in its mechanism, and ever increasing and multiplying upon the earth, far beyond the requirements of

the mere maintenance of their races, were enabled to escape, as species, the assaults of the tyrant tribes, and to exist unthinned for unreckoned ages. It has been weakly and impiously urged,—as if it were merely with the geologist that men had to settle this matter,—that such an economy of warfare and suffering,—of warring and of being warred upon,—would be, in the words of the infant Goethe, unworthy of an all-powerful and all-benevolent Providence, and in effect a libel on His government and character. But that grave charge we leave the objectors to settle with the great Creator himself. Be it theirs, not ours, according to the poet, to

> 'Snatch from His hand the balance and the rod,
> Rejudge His justice, be the god of God.'

Be it enough for the geologist rightly to interpret the record of creation,—to declare the truth as he finds it,—to demonstrate, from evidence no clear intellect ever yet resisted, that He, the Creator, from whom even the young lions seek their food, and who giveth to all the beasts, great and small, their meat in due season, ever wrought as He now works in His animal kingdom,—that He gave to the primeval fishes their spines and their stings,—to the primeval reptiles their trenchant teeth and their strong armour of bone,—to the primeval mammals their great tusks and their sharp claws,—that He of old divided all His creatures, as now, into animals of prey and the animals preyed upon,—and that from the beginning of things He inseparably established among His non-responsible existences the twin laws of generation and of death."*

But not only geology, but also physiology teaches us the

* MILLER'S "*Testimony of the Rocks*," pp. 74-76.

existence of death among the inferior animals before sin. Large classes of existing species are carnivorous; they are made with the design that they should live upon other animals, and with this view their whole animal frame is constructed. They are provided with peculiar teeth to tear and devour, with sharp claws or talons to seize their prey, with powerful muscles to overcome resistance, with stings to pierce their victims, and with a digestive apparatus appropriate to the nature of their food. Indeed, so much is this the case, and so related is each portion of the animal frame to the whole, that a skilful anatomist can, on the inspection of a single bone, declare whether the animal to which it belongs was carnivorous or herbivorous. By far the greater number of carnivorous animals could not possibly exist on vegetable food; their natures are so constituted that they derive nourishment only from the flesh of other animals.* The fish also which inhabit our seas, and rivers, and lakes, do, with a very few exceptions, all prey upon each other. Now it was God who made animals so; it was He who designed and formed them to live on animal food. "The young lions roar after their prey, and seek their meat from God."

Some suppose, in order to get rid of this difficulty, that carnivorous animals were not created until after the fall or the deluge; but this is a mere gratuitous assumption, for which not the slightest proof can be advanced. Others

* "The anatomical structure," says Dr. Pye Smith, "of the larger part of animal species presents demonstration that they were created to live upon animal food. There are those who have affirmed the contrary, and have supposed that, by persevering practice, lions, and wolves, and all carnivorous creatures, might be brought to live on a vegetable diet. Every physiologist must smile at this monstrous absurdity. A few species, indeed, are omnivorous; and this circumstance has misled some persons."—Smith's "*Geology and Scripture*," pp. 263, 264, Bohn's edition.

think that after the fall the nature and structure of these animals were completely altered, so that, whereas they were before that event herbivorous, they were then made carnivorous. "All the inferior creatures," observes a modern expositor of the first chapter of Genesis, "were created with gentle and peaceful dispositions. A great alteration must have taken place in their natures, before they began to desire other food than what was at first appointed them; and a still greater, before they were visited with the fierce desire of preying upon one another. At first these instincts and appetites of the lower animals might not be fully developed. The springing up within them of wild instincts, not before felt, would inspire them with new tastes and desires, and give full play to all their bodily energies. The new dispositions of not a few of them led them to destroy and devour their fellow-creatures; and their great strength, now exerted to the utmost, ensured them complete success. And the very circumstance of their drinking warm blood, and eating raw flesh, would have a powerful tendency to render their natures more and more savage and cruel. They were no longer herbivorous; they were now *carnivorous* and truly wild."* But it is sufficient to observe, in order to refute this most extravagant hypothesis, that a change so great would be equivalent to a new creation; a herbivorous animal could not possibly become carnivorous, unless almost every bone, and muscle, and tooth were altered. In short, it is a law pervading by far the greater part of the inferior creation, that animal life is sustained and supported by the dead bodies of other creatures.

If we attend more minutely to the animal economy, we

* "*The Creative Week*," pp. 375, 376.

will arrive at the unavoidable conclusion, that organic life necessarily involves death. In the vegetable world the plants derive their nourishment, in a considerable measure, from inorganic matter, either from the atmosphere or from the soil on which they grow. But it is entirely otherwise with animal life. It is supported by dead organic matter. Animals do not live on air or on dust, like plants, but either on vegetable or animal food. Thus then there is a continual circle of life and death; by death, animal life is supported and sustained. The plant withers and the animal dies, but out of this region of decay and death, new life springs forth, and innumerable living creatures derive their nourishment. Some have thought that animal life might be entirely sustained by dead vegetable matter; but not to mention that, if this were the case, the supply of food would fall short of the demand, this hypothesis would, either not remove the difficulty as to the necessity of death, or would require by far the greater number of living creatures to be blotted out of existence. "In every leaf, or root, or fruit which animals feed upon, and in every drop of water which they drink, they put to death myriads of living creatures, whose bodies are as 'curiously and wonderfully made' as our own, which were full of animation and agility, and enjoyed their mode and period of existence as really and effectively under the bountiful care of Him 'who is good to all, and whose tender mercies are over all His works,' as the stately elephant, the majestic horse, or man, the earthly lord of all."*

But did death exist in the paradise of God? Did beasts then tear and devour each other as they do now? Did Adam in paradise witness the anguish, and pain, and

* Smith's "*Geology and Scripture*," pp. 87, 88. Bohn's edition.

death of the inferior animals? Would you rob Eden of its immortality and its bliss? But there is nothing whatever in the scriptural description of paradise, unless it be a few remote references to be afterwards adverted to, that would lead us to suppose that the lower animals were endowed with the same privilege of immortality as man. The tree of life was expressly planted and provided for Adam; but we read of no tree of life to which the lower animals might repair, and eat, and live for ever; we read of no promise of life or threatening of death made to them, nor of any connexion between their death and the eating of the forbidden fruit by man. And therefore we have no hesitation in affirming, supported as we are by science and uncontradicted by Scripture, however opposed it may be to prevalent opinion, and however at variance it may be with our preconceived notions of the primeval state of the world, that even before the fall, beasts tore and devoured each other as now,—that then as now the lower creation was divided into animals of prey and animals preyed upon,—and that then as now there existed the ravenous lion, the ferocious tiger, and the venomous serpent,—and that then as now there was, as regards the lower animals, a constant circle of life and death.*

And now, let us observe, in passing, what great light this fact of the existence of death in paradise, as regards the lower animals, casts upon the trial of obedience and the threatening of disobedience proposed to our first parents. "In the day thou eatest thereof," said God to Adam, "thou shalt surely die." Death was the penalty of disobedience; but if there were no death in paradise, if

* Some suppose that ravenous animals were excluded from the small region or district of the earth which constituted paradise: to this no objection can be urged, except that it is a mere gratuitous supposition.

the inferior animals were immortal, Adam would have remained ignorant of the nature of the penalty; whereas, witnessing the pangs of death in the inferior animals, seeing the agonies of dissolution, he would not only understand what was meant by death, but would feel it to be a truly awful calamity. He was created superior to the lower animals, not merely in being possessed of a rational soul, but also in being honoured with immortality, whilst they were subject to death. This glorious distinction, however, he forfeited when he fell; he reduced himself to the same level with the beasts which perish, in becoming like them subject to death; and, as regards his immortal soul, subject to a yet deeper degradation, the greatness of which eternity only can disclose. "The wages of sin," the punishment threatened to disobedience, "is death,"—a curse indeed, since it deprived man of immortality, the peculiar privilege of his race, and exposed him to the wrath of his offended Creator.

II. The second point is to prove that this ascertained fact of geology, the existence of death among the inferior animals before sin, *is not contradicted by the statements of revelation.*

This we conceive is a point which is very easily made out; for nowhere does the Scripture teach us directly, and it is only by a forced interpretation that it is supposed to teach us indirectly, that the death of the inferior animals was a consequence of the sin of man. If we carefully read over the description given us of paradise in the second and third chapters of Genesis, we will find not the least hint that the lower animals were at first immortal. And there seems a fitness in immortality being restricted to that class of creatures who alone were endowed with reason and a capacity for religion.

Some expressions in the sentences pronounced after the

fall are supposed to favour the notion that the inferior animals suffered as well as man. Thus the curse pronounced upon the serpent, that it would go upon its belly and eat dust all the days of its life, is thought by some to teach, that, after the fall, the nature of that animal was changed; but, not to mention that this curse is expressly limited to the serpent, and cannot without violence be applied to other creatures, it is evident from the narrative that it was pronounced upon the one great Serpent, the Tempter or evil spirit. It does not concern our present argument to inquire what the meaning of the passage truly may be; enough that we show it has no bearing on the question we are discussing.—Again, a part of the sentence pronounced upon the man is supposed to imply a change in the climate or in the nature of the soil: "Cursed is the ground for thy sake: in sorrow shalt thou eat of it all the days of thy life. Thorns also and thistles shall it bring forth to thee: and thou shalt eat of the herb of the field." But supposing this to be the true interpretation of the passage, yet we cannot see what connection it has with the point in question; a supposed change in the climate or soil is no objection against the death of animals before that change took place: both facts may be consistently admitted and maintained.

But whilst there is nothing in the description of paradise at variance with the notion that the inferior animals were subject to death before sin entered into the world, there is, we think, something in its favour. The command given to be "fruitful, and multiply, and fill the earth and the sea," pronounced at the creation of these animals, implies a succession of beings, and consequently involves death. The law of reproduction implies, as its counterpart, the law of dissolution. If animals were naturally immortal,

they would, by being fruitful and multiplying, soon overstock the world, and the earth would not be able to produce vegetable food sufficient for their nourishment. The same command was indeed addressed to man; but we are expressly told that man, before he fell, was immortal and not subject to death; so that it is most probable, if he had preserved his innocence, he and each of his posterity, after a season of probation on earth, would have been translated, without dying, to a higher state of being.

There are also some expressions in St. Paul's epistles which are thought to teach that the sin of man was the cause of the death of the inferior animals. Of such a nature is the following passage:—"By one man sin entered into the world, and death by sin: and so death passed upon all men, for that all have sinned." But the statement is here expressly limited to the human race; it is declared to apply to all men and to those who had sinned: but the brute creation are incapable of moral obedience or disobedience toward God, and therefore death to them cannot be the punishment of their sins. A similar statement is made in the first Epistle to the Corinthians:—"Since by man came death, by man came also the resurrection of the dead. For as in Adam all die, even so in Christ shall all be made alive." Here, also, there is an express limitation to the human race—to that order of beings who shall be raised from the dead, and whom Christ shall make alive—and therefore the words cannot possibly apply to the inferior creation. Another passage, much insisted upon, is St. Paul's description of the oppressed creation:—"The creature was made subject to vanity, not willingly, but by reason of Him who hath subjected the same in hope. We know that the whole creation groaneth and travaileth in pain together until now." The passage is evidently

obscure: it cannot be proved that the term creation includes the lower animals,—the more probable meaning being, that it is restricted to the human race; but even although it should be so extended as to embrace all creatures, yet it does not assert that the death of the inferior creatures was caused by sin; the utmost that it asserts is that they suffer, as in many ways they do by cruelties and oppressions, from the sins of men. As regards those passages in the prophets, which predict the happy and peaceful reign of the Messiah by a change on the propensities of the inferior animals, so that from being ravenous and venomous they became gentle and harmless, it is evident that these are expressions, conceived in the happiest spirit of poetry, denoting the great moral changes which shall be effected by the prevalence of the Gospel. "The wolf shall dwell with the lamb, and the leopard shall lie down with the kid, and the calf, and the young lion, and the fatling together; and a little child shall lead them. And the cow and the bear shall feed; their young ones shall lie down together; and the lion shall eat straw like the ox. And the sucking child shall play on the hole of the asp, and the weaned child shall put his hand on the cockatrice' den. They shall not hurt nor destroy in all my holy mountain; for the earth shall be full of the knowledge of the Lord, as the waters cover the sea."*

From these scriptural passages it is evident that death, as it regards man, is a very different thing from death, as it regards the lower animals. As it regards the lower animals, death is merely the law of their nature. They die, because

* The future fate of many ravenous animals seems rather to be to become extirpated, than to have their ferocious natures changed. This will probably be the fate of many of them, when the human race becomes more civilised and more numerous.

they were so constituted; their existence necessarily and inevitably leads to death. With regard to them, there is no connexion between sin and death; they are not morally accountable creatures, they are incapable of moral obedience or disobedience toward God. But it is very different with death as it regards the human race. Here it is inseparably connected with sin. It was sin which gave birth to death; sin is its cause, its origin, its producer. Man as originally created was endowed with the high privilege of immortality; if he had remained in innocence, he would not have died; he would probably have been translated to a higher world, like Enoch and Elijah; but having sinned he has become liable to death. And this death is always present with him. The lower animals are ignorant of their fate; the fear of death does not trouble them, or break in upon their happiness. But it is not so with man; he knows that he must die, and this his knowledge often makes him wretched. We are accustomed to regard death as dreadful; to our race it is so, but not to the other creatures. It is sin which makes this great difference; it is this which causes death to be such an alarming event to man. To the human race, then, the cause of death is sin; but to the inferior animals, it is the original law of their nature. "By one man sin entered into the world, and death by sin: and so death passed upon all men, for that all have sinned."

III. The third point is to endeavour to shew that *death, and even death by violence, among the inferior animals, is a benevolent dispensation.*

Death, as it regards man, is a punishment, a penalty; but death, as it regards the inferior animals, is no penalty whatever, but a benevolent dispensation. At first sight, indeed, it seems that death is an infliction; and more especially

the violent death of animals, the existence of beasts of prey furnished with weapons of destruction, is supposed to be at variance with unmixed benevolence, and hence it is inferred that it could not have existed in a world of innocence. But this arises from a very partial view of the subject. If there were no death, or, in other words, if animals were immortal, even supposing that such a state of things could exist in conformity with the laws of organic life, it is evident that happiness would be limited to a comparatively small number; animals could not possibly increase and multiply as they do at present, for in a short time there would be no room in the world to contain them; the dry land and the sea would be overstocked. Happiness, then, would be confined within narrow bounds; it could not extend beyond the limits of a single generation. But surely it is much more agreeable to our notions of the goodness of God to conceive, that He should communicate happiness to many, rather than restrict it to a few. Now this is accomplished by a succession of different creatures. When one race of animals have enjoyed their existence, they give place to another race; and thus the pleasure of existence is multiplied manifoldly.* True,

* Dr. Hitchcock well observes, that young animals enjoy more, in the same period of time, than those more advanced in age. "This," he remarks, "arises partly from the superior health and vigour enjoyed by the young, but partly also from the novelty of the scenes presented in early life; and so far as it results from the latter cause, it proves that a succession of races would enjoy more than a single race continued indefinitely, because the successive races would always be comparatively young."—HITCHCOCK's "*Religion of Geology*," p. 85. See also some valuable remarks on this subject in HARRIS' "*Pre-Adamite Earth*," part fifth. "A world of immortal animals and plants," he observes, "a world that knew no climatic change, no seasons, no organic nor inorganic variety—a stagnant and unprogressive creation—would be as unsuited to the created as to the Creating mind."—p. 225.

this requires the introduction of death; but death is no great evil to the lower animals. It is merely the deprivation of happiness to individuals; but this is far more than counterbalanced by the happiness conferred on successive races, and diffused over so immense a variety and multitude of creatures. There is, then, under the present system, a far greater amount of happiness conferred, than there would be on the hypothesis of the immortality of the lower creation.

But some do not object to death itself as regards the inferior animals, but to death by violence, to the existence of carnivorous animals, and they conceive that this is at variance with our notion of unmixed benevolence, and hence regard it as being one of the evils accompanying the fall of man, and the result of sin. But the problem just resolves into this, What kind of death is the most beneficial to the animal itself, or to the animal creation in general,—whether death by natural decay and old age, or death by violence? Now, to take the first supposition, it is evident that a brute animal, left to perish by natural decay, is placed in a condition of great misery. In human infirmity there is the assistance of a man's friends to alleviate his pains, and minister to his necessities. But there is nothing analogous to this care and tenderness of man for man in the lower animals. When the limbs of a beast become stiffened from age, so that it can no more hunt for its food, no fellow ministers to its necessities; when its strength fails, no assistance is afforded to supply the place of its activity; when its senses are blunted, no relief is administered; and it must either perish from absolute starvation, or drag out a miserable existence, from scarcity of food. Even in our domestic animals, when old age overtakes them, we are frequently constrained to put a violent end to their existence, from compas-

sion for their sufferings. But on the other supposition of death by violence, the animal is in the full enjoyment of health and vigour, it suffers nothing from the infirmities of old age, and its life is taken from it almost instantaneously, and in general without much pain. Most of the carnivorous animals, it has been ascertained, endeavour to seize their victims on a particular point at the back of the neck, where a wound of the spinal nerve causes either paralysis or instantaneous death, and apparently no suffering.* And, besides, beasts are not troubled with fears and anxieties about the future; they enjoy the present hour, and know not what awaits them the next. "A hare," it has been well remarked, "notwithstanding the number of its dangers and enemies, is as playful an animal as any other." And farther, we do not think that we should overlook in our argument the positive enjoyment, derived from this system, to the carnivorous animals, in the pursuit and capture of their prey. Immortality, then, being out of the question, death by violence, far from being inconsistent with the goodness of God, is an instance of His kindness and care toward the lower animals. Food is thus afforded to the beasts of prey, and their victims, by a sudden death, are saved the far greater and more prolonged sufferings of an uncared for old age.†

* Some animals of the feline family appear to form an exception to these remarks, as they torture their victims before killing them; but even in these instances the animal preyed upon is paralysed.

† The argument is well stated by Professor Ansted, in his "Ancient World," and he arrives at the conclusion that death by violence is to all unreasonable animals the easiest death: and he adds that "it would be as unreasonable to doubt the wisdom and goodness of this arrangement, as it would be to call in question the mutual adaptation of each part in the great scheme of creation."—ANSTED'S "*Ancient World*," p. 168, second edition.

Another thing to be taken into consideration, besides the desirable relief from the sufferings of old age, is that by means of carnivorous animals, an excessive increase of any particular species is controlled and prevented. Many animals multiply so rapidly that, unless there were some check, they would soon occupy the room allotted to other animals. Now this necessary check is afforded by the existence of the carnivorous animals; they limit this animal superfecundity; and thus the whole system of creation is kept in its proper proportions. Those animals who have few or no enemies are found to increase very slowly; while those who are exposed to a multitude of foes increase in a greater proportion. And thus it happens that whilst no one species is extirpated by carnivorous animals, none is permitted so to multiply as to occupy an undue space in creation. And over and above these beneficial effects, it is in general the old and the sick that are removed to make room for the young and the healthy; and each dead body affords the means of nourishment and enjoyment to other creatures. In short, the language of universal nature is, "O Lord, how manifold are thy works! in wisdom hast Thou made them all: the earth is full of Thy riches. So is this great sea, wherein are things creeping innumerable, both small and great beasts. These wait all upon Thee, that Thou mayest give them meat in due season."*

* This subject is most ably treated by Dr. Paley in his Natural Theology, Chap. xxvi, and by Dr. Buckland in his Bridgewater Treatise, Chapter xiii. "The appointment of death," observes Dr. Buckland, "by the agency of the carnivora, as the ordinary termination of animal existence, appears in its main results to be a dispensation of benevolence; it deducts much from the aggregate amount of the pain of universal death; it abridges, and almost annihilates, throughout the brute creation, the misery of disease, and accidental injuries, and lingering decay; and imposes such salutary restraint upon excessive increase

It is because death is a punishment and a terrible calamity to us, that we suppose it to be the same to the inferior creatures, forgetting that it is sin which makes all the difference. "The sting of death," says the apostle, "is sin." It is this which arms death with deadly venom, and converts it into a terrific enemy. Death and sin are thus, as regards man, inseparably connected. Man is troubled with the terrors of an accusing conscience, and the fears of a coming retribution. He feels that guilt attaches itself to his soul, and exposes him to the wrath of his offended Creator. He cannot lose sight of the fact that he is a morally accountable being; that this is the peculiar property and the awful responsibility of his race. And hence it is that he trembles to think of death, because he knows not what is beyond, and his fears rather than his hopes prevail. If it were not for sin, death would not be so great a calamity; the considerations of a calm philosophy would reconcile us to our fate. It is not so much death that we dread, the mere loss of animal life; it is the consequences which follow after; it is that state of retribution where we know not what awaits us. The certain prospect of death, the loss of earthly happiness, the pains of dissolution, all these are indeed evils, but none of these, nor all of them together, constitute the real terror of death as regards the human

of numbers, that the supply of food maintains perpetually a due ratio to the demand. The result is, that the surface of the land and depths of the waters are ever crowded with myriads of animated beings, the pleasures of whose life are co-extensive with its duration; and which, throughout the little day of existence that is allotted to them, fulfil with joy the functions for which they were created. Life to each individual is a scene of continued feasting in a region of plenty; and when unexpected death arrests its course, it repays with small interest the large debt, which it has contracted to the common fund of animal nutrition, from whence the materials of its body have been derived."

race; it is the fear of the wrath to come,—the awful consciousness of unpardoned guilt.

We do not here mean to affirm that the consciousness of sin, and the dread of a future retribution, are the only circumstances which render death more terrible to man than to the inferior animals. There are numerous other considerations, such as the frustration of all our earthly plans, the loss of intelligent enjoyment, the disappointment of our earthly hopes, the separation from those we love, which, even apart from the consideration of a future retribution, render death terrible to man; and none of which considerations affect the inferior animals. But still the chief consideration, the real terror and sting of death, is sin.

And accordingly, death to the good man is not so great a calamity. Christ has vanquished this great enemy. He does not indeed deliver His people entirely from its dominion; He does not at once confer on them an immortal life; but He changes as regards them the nature of death, —He deprives it of its sting. When a man feels that his sins are pardoned, when the heavy load of guilt is removed from his conscience, death appears to him no longer terrible; it is merely the mode of his departure to another, and higher, and purer state of existence. He feels, with the apostle, that "to die is gain:" and that when the earthly house of this tabernacle is dissolved, he has a building of God, an house not made with hands, eternal in the heavens. And hence it is that the death of believers in Scripture is not spoken of as death, but as a sleep; when the soul falls asleep in Jesus, with the humble hope of again awakening to a glorious immortality. And, perhaps, no where has faith obtained greater triumphs, no where has the power of Christianity been more conspi-

cuously displayed, than on the bed of death. This has often been to the true Christian the field of victory, and death has been to him a triumphal chariot in which, like Elijah of old, he has entered the gates of the celestial city. Thus has death ceased to be death; it has been converted into a joyful translation from earth to heaven. The curse has been removed; death only bears the mere external appearance of an evil; it is, in reality, the messenger of peace which calls the soul to heaven.

Such we consider to be the true nature of death, both as regards the inferior animals, and as regards the human race. To the inferior animals, it is a benevolent dispensation; to man, it is a part of the original curse, but to those who are redeemed through Christ the curse is converted into a blessing, and death becomes merely the manner in which the soul passes from this world of sin and sorrow to the glories and happiness of heaven. The Christian dies; but his death is the birth of his soul,—the commencement of his heavenly existence.

"He sets
As sets the morning star, which goes not down
Behind the darkened west, nor hides obscured
Among the tempests of the sky, but melts away
Into the light of heaven."*

* Quoted from Hitchcock's "*Religion of Geology*," p. 92.

CHAPTER VI.

THE DELUGE.

It has until lately been the generally received opinion, both among biblical scholars and scientific writers, that the deluge of Noah was universal in its extent, so that every portion of the earth was covered by its waters. The terms in which the narrative is given are so broad as apparently to countenance this opinion. We are told that "all flesh died that moveth upon the earth, both of fowl, and of cattle, and of beast, and of every creeping thing that creepeth upon the earth, and every man;" and "that all the high hills that were under the whole heaven were covered." The discoveries of geology, until recently, appeared to confirm this opinion. The marks of the agency of water were seen to be indelibly impressed upon the rocks; vast numbers of shells and other marine animals were discovered in all parts of the earth, even at the tops of the highest mountains; and, what was regarded by the better informed as more conclusive evidence, immense quantities of drifted materials, clay, sand, and gravel, were found lying upon the surface; and the most distinguished geologists of the day, with very few exceptions, affirmed that these drifted materials were proofs of the universality of the deluge. Of late, however, in consequence of more recent discoveries, and a more minute

inquiry into geological phenomena, geologists have changed their views; and it is now the general opinion among them, that in this part of the world at least, there are no traces whatever of the deluge; and some of our most distinguished Biblical geologists affirm that there are conclusive arguments, derived from geology and other kindred sciences, which prove that the deluge could not have been universal; they judge that it was local in its extent and effects, and was chiefly confined to Armenia, or at least did not extend beyond western Asia.*

Here, then, there is an apparent discrepancy between the statements of revelation and the teachings of science. Revelation appears to affirm that the deluge was universal in its extent and effects; science, on the other hand, is said to teach that it could only have been local; and that, consequently, although the human race, except Noah and his family, were destroyed by it, yet by far the greater number of the inferior animals were beyond the reach of its influence, and so escaped destruction. This is the subject which we propose to consider in this chapter—*the extent of the deluge*—whether it was universal or local? And we trust that we shall be able to demonstrate that here, as in other parts of the Mosaic narrative, there is no contradiction between Scripture and science.

There are two points which here require to be discussed, the teachings of science, and the statements of revelation concerning the deluge. We shall first, consider the light which science casts on this event; and secondly, advert to the Scriptural statements concerning it.

I. In the first place, then, we have to consider the light which science casts upon the deluge.

* This is the decided opinion of Dr. Pye Smith, Dr. Hitchcock, Dr. King, and Hugh Miller.

There was formerly a class of divines, known by the name of the Physico-theological school, some of whom exist even to this day, who taught that Scripture, when rightly understood, contains a complete system of natural philosophy. They employed themselves chiefly in constructing cosmogonies, or theories concerning the creation of the world, and the most remarkable changes which it has undergone. In these theories the deluge occupied a conspicuous place, and the most gigantic effects were ascribed to it. The most renowned of these ancient cosmogonists was Dr. Thomas Burnet.* His work bears the strange title, "The sacred theory of the earth, containing an account of the original of the earth, and of all the general changes which it hath undergone, or is to undergo, till the consummation of all things." This work is full of the most extravagant suppositions, but yet is written with considerable elegance. According to Dr. Burnet, the face of the earth before the deluge was smooth and regular, without mountains and without a sea: "it had," as he expresses it, "the beauty of youth and blooming nature, fresh and fruitful, and not a wrinkle, scar, or fracture in all its body; no rocks, nor mountains, no hollow caves, nor gaping channels, but even and uniform all over."† The crust of the earth, however, being heated by a perpetual summer, was at length broken up, so that the waters in the interior of the globe rushed out and caused the deluge.

* Dr. Thomas Burnet must not be confounded with the celebrated Bishop Gilbert Burnet, a mistake which has been made by several writers.

† Burnet's *Theory*, Vol i. p. 65, Glasgow edition of the year 1753. This work is divided into four books,—1st, Concerning the Deluge. 2d, Concerning Paradise. 3d, The burning of the world. 4th, The new heavens and the new earth. It is illustrated by numerous curious plates, shewing the state of the earth under these different conditions.

Dr. Woodward, the founder of the Professorship and Museum of Mineralogy in the University of Cambridge, supposed that by means of the deluge, "the whole terrestrial globe was taken to pieces and dissolved, and again settled down from this promiscuous mass, as any earthy sediment from a fluid." Whiston, the successor of Newton as Professor of Mathematics, published in 1696 his "new theory of the earth from its original to the consummation of all things," being designed to be an improvement of Dr. Burnet's theory. He supposed that the deluge was caused by a comet coming in contact with the earth, and agreed with Woodward in supposing all stratified deposits to have arisen from "the chaotic sediment of the earth." To such an extent did these ancient cosmogonists carry their views, that Hutchinson, an opponent of Woodward, published a work entitled "Moses' Principia," designed as an answer to the Principia of Newton, in which he endeavoured to deduce the facts of natural philosophy from Scripture. And even in our own time such like extravagancies have been taught. The Rev. William Kirby, in his Bridgewater Treatise, "On the history, habits, and instincts of animals," not only agrees with Dr. Burnet in supposing that there is a subterranean ocean, but also supposes that there exists a subterranean world of animals, and that the huge reptiles, whose remains are found in the rocky strata, formerly existed in the interior of the globe. Many of the extravagant opinions of the old cosmogonists have been revived by Granville Penn, Dean Cockburn, Fairholme, and other writers of the antigeological school.

But omitting these and such like extravagancies, as now unworthy of refutation, we would observe first, that *the fossil remains are not and cannot possibly be the effects of the deluge.*

The fossil remains, which are found in the stratified rocks, in all the places of the earth's surface, and at all heights, were formerly supposed to have been deposited by the flood of Noah. When, especially, it was found that most of these fossils were of marine origin, they were considered as incontrovertible proofs of the reality and extent of the deluge. Shells and the remains of fish and of marine lizards are most plentifully distributed throughout the earth, at the tops of hills as well as in valleys, thus proving beyond doubt that the places where they are found were once under water. Now it was very natural, in the infancy of geology, to refer all these to the deluge.* It is, however, completely inexcusable in the present day; and yet we find the same error made in theological works of authority and repute. Thus Horne, in his Introduction to the Scriptures, remarks, "The universality of the deluge is confirmed by the fossilized remains of animals belonging to a former world, which are found in every quarter of the globe."† And in the edition of Buck's Theological Dictionary, by the late Dr. Henderson of Highbury College, there is the following statement, without note or correction. "It may also be observed that in the regions far removed from the Euphrates and Tigris, viz., Italy, France, Switzerland, Germany, England, &c., there are frequently found,

* In the seventeenth and beginning of the eighteenth centuries, a great controversy was carried on among naturalists, as to whether the fossil remains were the effects of the deluge. The celebrated naturalist Scheuchzer, in 1708, wrote a treatise on a fossil skeleton, under the title of "Homo Diluvii Testis," and which he asserted was the skeleton of a man who had been drowned in the flood. This gave rise to a very animated and prolonged controversy. The skeleton was afterwards examined by Cuvier, and proved by him to belong to a lizard of an extinct species.

† Horne's "*Introduction to the Scriptures*," Vol. i. p. 148, ninth edition.

in places many scores of leagues from the sea, and even at the tops of high mountains, whole trees sunk deep under ground, as also teeth and bones of animals, fishes entire, sea shells, ears of corn, &c., petrified, which the best naturalists are agreed could never have come there but by the deluge."*

Now none that are in the least degree acquainted with geology, need be told that this opinion is most unfounded and extravagant. If these organic remains had been deposited by the flood, they would all have been confusedly mixed together; but on the contrary, they are found in the rocky strata regularly arranged as in a cabinet; there is no mixture of land and marine animals, and each formation has its own peculiar fossils. All these fossil animals, moreover, except a very few in the uppermost strata, are of extinct species; whereas, if they had been the relics of the antidiluvian world, they would have corresponded for the most part with living plants and animals; the remains of man and his works would certainly have been found, whereas no vestige of this kind has been discovered embedded in any of the rocks, except those which are now forming. But what puts the matter beyond doubt is the vast thickness of the fossiliferous rocks. It has been clearly demonstrated that they extend downwards to a depth of from six to seven miles, and that they are made up of hundreds of different beds containing peculiar fossils; so that it is altogether impossible that they could have been the effects of a temporary deluge, which at the longest lasted only for little more than a year.

Secondly, *What is termed the drift or diluvium is not the effect of the deluge.*

* This edition of Buck's "Theological Dictionary," was published so late as the year 1851. Dr. Campbell of London commits the same egregious error in his notes to the Bible recently published.

There are found scattered, here and there over the surface of this country, and in northern and high southern latitudes, vast quantities of rubbish or detritus, composed of clay, sand, gravel, and huge stones called boulders, which have evidently been drifted to their several positions by the action of some powerful deluge. Besides, there are many caves, in which are found the bones and skeletons of different animals, several of them being the same as those now existing. It has also been proved that all these accumulations and remains are comparatively of very recent origin,—that they occurred after the Tertiary or the most recent formation. Now it was very natural to refer all these to the action of the universal deluge, and geologists of the highest standing and eminence adopted this opinion and published in defence of it. Such, in particular, was the theory advanced by the illustrious Cuvier; and in our own country, at one time supported by Dr. Buckland in his "Reliquiæ Diluvianæ,"—though afterwards formally renounced by him. By Dr. Buckland, the deluge was represented as excavating valleys, carrying fragments of rocks from one place to another, strewing the earth's surface with immense quantities of gravel, and washing the dead bodies of animals into caves and holes.*

It is a difficult matter to exhibit clearly the evidences by which it has been fully demonstrated, that the drift, or, as Buckland termed it, the diluvium, cannot be the effect of any temporary deluge, because the proof depends on a

* An animated and interesting controversy was carried on, on this point, between Dr. Buckland and the late Dr. Fleming of Edinburgh. Dr. Fleming contended that the deluge had left no traces of its operation upon the surface of the earth. "I am not," he says, "prepared to witness in nature any remaining marks of the catastrophe, and I find my respect for the authority of revelation heightened, when I see, on the present surface, no memorials of the event."

multitude of particulars, the full force of which can only be appreciated by the geologist. All those distinguished geologists, Buckland, Sedgwick, Greenough, Hitchcock, and others, who formerly taught otherwise, have one by one openly renounced their opinions, and now declare that the drift is a deposit, or rather a series of different deposits, antecedent to the deluge, and which, or at least the greatest portion of it, occurred before the present creation. Thus Dr Buckland, in a note in his Bridgewater Treatise, candidly renounces the opinion advanced in the Reliquiæ Diluvianæ.

"The evidence," he there says, "which I have collected in my 'Reliquiæ Diluvianæ,' 1823, shows that one of the last great physical events that have affected the surface of our globe, was a violent inundation, which overwhelmed great part of the northern hemisphere, and that this event was followed by the sudden disappearance of a large number of the species of terrestrial quadrupeds, which had inhabited these regions in the period immediately preceding it. I also ventured to apply the name *Diluvium* to the superficial beds of gravel, clay, and sand, which appear to have been produced by this great irruption of water.

"The description of the facts that form the evidence presented in this volume, is kept distinct from the question of the identity of the event attested by them, with any deluge recorded in history. Discoveries which have been made, since the publication of this work, show that many of the animals therein described, existed during more than one geological period preceding the catastrophe by which they were extirpated. Hence it seems more probable, that the event in question was the last of the many geological revolutions that have been produced by violent irruptions of water, rather than the comparatively tranquil inundation described in the inspired narrative.

"It has been justly argued, against the attempt to identify these two great historical and natural phenomena, that as the rise and fall of the waters of the Mosaic deluge are described to have been gradual, and of short duration, they would have produced comparatively little change on the surface of the country they overflowed. The large preponderance of extinct species among the animals we find in caves and in superficial deposits of diluvium, and the non-discovery of human bones along with them, afford other strong reasons for referring these species to a period anterior to the creation of man."*

Professor Sedgwick expresses himself in similar terms. "Bearing," he says, "upon this difficult question there is, I think, one great negative conclusion now incontestibly established — that the vast masses of diluvial gravel, scattered almost over the whole surface of the earth, *do not belong to one violent and transitory period.* It was, indeed, a most unwarranted conclusion, when we assumed the contemporaneity of all the superficial gravel on the earth. We saw the clearest traces of diluvial action, and we had, in our sacred histories, the record of a general deluge. On this double testimony it was, that we gave a unity to a vast succession of phenomena, not one of which we perfectly comprehended, and under the name diluvium, classed them all together. Our errors were natural, and of the same kind which led many excellent observers of a former century to refer all the secondary formations of geology to the Noachian deluge."†

The drift formation is one of the most difficult problems in the science of geology. Geologists are not agreed as to the precise period of its occurrence, its cause, its duration,

* Buckland's "*Bridgewater Treatise*," pp. 94, 95.

† Sedgwick's Address to the Geological Society in 1831.

and the mode of its operation; but on this point they are agreed, that it could not have been the effect of one temporary deluge. The reasons or facts by which they have arrived at this conclusion are such as the following:—1. It has been proved that the drift, however widely spread, is local, and not universal in its extent. It is chiefly confined to northern and high southern latitudes; no traces of it are found in equatorial regions; and it is also wholly awanting in countries bordering on the Mediterranean. 2. It has been proved that the drift consists, not of one, but of several deposits which occurred at very different periods. There are distinct sets of accumulations, the one often lying above the other, which could not have been caused by the same flood of waters.* 3. It has been proved that the drift formation occupied immense periods of time. There are extensive erosions and denudations caused by it, which would require ages to produce. And the huge stones or boulders are in general rounded, proving that they were for a considerable time exposed to the action of water. All these effects could not have been produced in the course of a year. 4. A large proportion of the animals, found in caves and superficial deposits of the drift, are of extinct species, thus affording the presumption that they belong to a creation anterior to that of man; and this opinion is confirmed by the fact that no remains of man or of his works are found in the drift. 5. The drift has been caused chiefly by the agency of ice, and not simply of water. Many of the huge boulders, it

* "The Scandinavian boulders in the north of Germany," observes Professor Sedgwick, "are of an older date than the diluvium of the Danube; and we can prove, that the great erratic blocks, derived from the granite of Mount Blanc, are of a more recent origin than the old gravel in the tributary valleys of the Rhone."

has been proved, have traversed seas and mountains, and are found at an elevation of several hundred feet. Now, the only natural agency known that could have produced these effects, is that of icebergs. Geologists, therefore, have come to the conclusion, that during the drift period the land was sunk to the depth of nearly two thousand feet, that nothing of Britain remained above the water except a few small islands, and that it was a season of intense cold, when icebergs deposited their contents on what now constitutes the surface of this island.* For these and a variety of other considerations, it is now the universally received opinion among well-informed geologists, that the accumulations of the drift could not have been the result of the Mosaic deluge.

Thirdly, The recent discoveries of geology and other kindred sciences, are by several biblical geologists and naturalists, considered to lead to the conclusion, that *the deluge was only local in its extent and effects.*

This is the chief point to be considered, and therefore requires a more careful examination than the other two. It is here that the teachings of science are supposed to come in contact with the teachings of revelation. We must, therefore, inquire into the facts of science,—what has been fully demonstrated on this point; and must by all means avoid asserting propositions to be true which have not been proved. Now there are several arguments brought forward, which we shall candidly examine and give to each its true weight.

1. It has been asserted that there are several geological phenomena which prove that the flood could not have

* The amount of submergence during the drift period has been variously estimated. It is said, that in Scotland, there are water-worn boulders found at altitudes of 1800 and 2000 feet.

been universal. There are in the southern part of the centre of France, in the province of Auvergne, a chain of mountains which contain a number of extinct volcanoes. The rivers have made themselves channels in the consolidated lava, to the depth of a hundred and fifty feet, and fossils have been found in strata, interposed between the volcanic beds, belonging to the Eocene, Miocene, and Pliocene groups of the Tertiary formation.* Now the argument stands thus: On the tops of these hills there are loose scoriæ, ashes, and other volcanic products. There is every reason for supposing that the Auvergne volcanoes have not been in action since the deluge, and that consequently these scoriæ were deposited before that event.† If, then, this were the case, it is argued that these hills could not have been exposed to the action of the diluvial waters, for these loose materials would have been washed away. For similar reasons, Sir Charles Lyell concludes that "no devastating wave has passed over the forest zone of Etna since any of the lateral cones were thrown up; for none of these heaps of loose sand and scoriæ could have resisted for a moment the denuding action of a violent flood;" and to these lateral cones he assigns an anti-

* Geologically, then, these hills are of recent origin, as they belong to the Tertiary formation, but this is long anterior to the creation of man. Mr. Scrope observes, that the vast excavations effected by the erosive power of the streams which feed the Ardèche, having made for themselves channels in the basalt-rock or consolidated lava, one hundred and fifty feet in depth, prove that even the most recent of these volcanic eruptions belong to an era incalculably remote.

† Sir Charles Lyell informs us that there are no proofs as yet discovered that these volcanoes have been in action since the Pliocene period. He observes, "The extinct volcanoes of Auvergne and Cantal, in Central France, seem to have commenced their eruptions in the upper Eocene period, but to have been most active during the Miocene and Pliocene eras."—LYELL'S "*Manual*," p. 550, fifth edition.

quity of no less than twelve thousand years.* In addition to the extinct volcanoes of Auvergne and Etna, several such accumulations of scoriæ are to be found in other parts of Europe; but there is a difficulty in determining their age, whether within or beyond the human period. The argument, however, we think, cannot be considered as demonstrative, and can only be viewed as a probable supposition, requiring to be corroborated by other arguments.†

2. It has been asserted, that there is not a sufficient quantity of water in the globe to cover the highest mountains. The height of the highest mountains has been estimated to be about five miles; and to cover them, it has been calculated, would require eight times the quantity of water that is in the globe. Now, the question just comes to be, Whence this immense quantity of water? From what reservoir did it flow, and what has since become of it? Accordingly, a vast number of hypotheses have been proposed, and great ingenuity displayed in answering the inquiry. Some suppose that there is a subterranean abyss from which the waters came, and to which they again retired; but science has demonstrated that no such subterranean ocean can possibly exist. Others, as Whiston, thought that the deluge was caused by a comet impinging upon the earth; but it has been proved that a comet is merely vapour. And others have resolved it all into a miracle,—that the waters were by a miracle created, and afterwards by a miracle annihilated. This, however, it has been replied, is a mere begging of the question; and we are not at liberty thus to assume miracles, when no

* Lyell's "*Principles of Geology*," p. 423, ninth edition.

† See this subject fully treated of in Lyell's "Manual," chap. xxxii., and in Scrope's "Memoir of the Geology of Central France." See also Pye Smith's "Scripture and Geology," pp. 134-139.

intimation of their occurrence is given. The Scriptures appear to assign the deluge to two natural causes—to the fountains of the deep being broken up, and to the windows of heaven being opened;* that is, to the ocean overflowing its banks, and to an excessive fall of rain; causes perfectly sufficient to account for a local deluge of considerable extent, but which, if the quantity of water in the globe remained constant, could not possibly produce a universal deluge.

3. It has been further urged, that the ark is of too small dimensions to contain pairs of all the unclean, and septuples of all the clean animals. Now, this argument just resolves itself into the inquiries, What was the size of the ark? and, What is the number of existing species of animals?

As to the size of the ark, its dimensions are given us in the sacred Scriptures; we are there told that it was an oblong building of three stories, and that it was "three hundred cubits in length, fifty cubits in breadth, and thirty cubits in height." There are different opinions as to the precise length of a cubit, as there were several cubit measures employed by the Hebrews.† Hugh Miller, in his "Testimony of the Rocks," adopts the natural cubit, being the length of the arm from the elbow to the end of the middle finger, or about eighteen inches. This would make the ark four hundred and fifty feet in length, and seventy-

* It is, however, still a disputed point among theologians, whether the causes here mentioned are to be regarded as wholly miraculous or simply natural: and if the causes were miraculous, that is, entirely removed out of physical laws, all inquiry as to the quantity of water necessary is superfluous.

† There seem to have been no less than four different cubit measurements among the Jews.

five feet in breadth;* and these dimensions multiplied by three, the number of stories, would give us the space which it contained, being in round numbers a hundred thousand square feet. Dr. Hales, who also adopts the natural cubit as his measurement, asserts that this would be sufficient "to carry 20,000 men, with provisions for six months, besides the weight of 1800 cannons, and of all military stores."† This, however, while making no provision for the cannon and stores, would only admit of five square feet to each man.

The next thing to be taken into consideration is the number of animals. When Dr. Hales made his calculation, he proceeded upon the assumption of the correctness of the number given by Buffon, about two hundred or two hundred and fifty quadrupeds;‡ but according to the latest calculation, it is estimated that of existing mammals there are, in round numbers, 1500 species, of birds 6000, and of reptiles, very few kinds of which can live in water, about 1000;

* According to Dr. Arbuthnot's calculation, the length of the ark is about 547 feet; its breadth 91 feet; and its height 55 feet. Sir Walter Raleigh, Shuckford, and Hales, give the same measurement as in the text. Hugh Miller remarks, that even adopting the larger cubit, (21 inches,) it would only give an area equal to about one-seventh of the great Crystal Palace of 1851; or the area of the three floors of the ark, taken together, would fall short, by about 28,000 square feet, of that of the northern gallery of the Palace, which measured 1848 feet in length, and 96 feet in breadth.

† This calculation is adopted by Horne, in his "Introduction to the Scriptures," and by Dr. Kitto, in his "Illustrated Commentary on the Holy Bible."

‡ Dr Hales' words are, "Can we doubt of its (the ark) being sufficient to contain eight persons, and about two hundred or two hundred and fifty pair of four-footed animals; a number to which, according to Buffon, all the various distinct species may be reduced, together with all the subsistence necessary for a twelvemonth."

and besides an immense number of species of insects, amounting to more than 500,000. Nor are all these recently discovered species of small bulk; on the contrary, some of them are the largest of existing animals; there are now discovered two species of elephants, and at least six species of rhinoceros, instead of one of each according to previous calculations. From this, then, it would appear, that there are upwards of 508,000 species of animals; and these require to be multiplied, some by two and others by seven, so that there would be more than a million which would require to be lodged in the ark, supposing the deluge to have been universal. And, besides the animals themselves, there is also their food, which was ordered to be stored up for them, and which would occupy at least as large a space as themselves.* Taking, then, these two facts into consideration—the size of the ark, containing a space of a hundred thousand square feet, and the number of animals which it would require to hold if the flood were universal, being more than a million with space for their food; it is extremely difficult to suppose, that the ark could afford sufficient accommodation to contain these animals and their food, even after every allowance has been made for the diminutive size of the greater number of them.

4. Another objection against the universality of the flood has been drawn from the well-known fact, that most animals are distributed into districts beyond the limits of which they cannot exist. Every large district has its peculiar plants and animals. "The great continents," says

* Many of the animals being carnivorous would require other animals to be provided for them, as food on which to subsist. Some kinds of food could scarcely be stored up; as the different plants and trees on which the insects subsist. "There are myriads of insects that can live upon but single plants that grow in very limited botanic centres."

Cuvier, "contain species peculiar to each; insomuch that whenever large countries of this description have been discovered, which their situation had kept isolated from the rest of the world, the class of quadrupeds which they contained has been found extremely different from any that had existed elsewhere. Thus, when the Spaniards first penetrated into South America, they did not find a single species of quadruped, the same as any of Europe, Asia, or Africa. Similar circumstances have occurred in our own time, when the coasts of New Holland and the adjacent islands were first explored." The animals which dwell in the frigid zone could not possibly survive one month, if they were conveyed to the torrid zone; and conversely, the animals which dwell near the equator would at once perish, if transported to the poles. In order, then, that all animals might be collected into the ark, we must conceive that some supernatural impulse was communicated to them, contrary to their natures, to wander from their fixed centres; that they were preserved in circumstances and in a climate where, if left to themselves, they would die; and that after the flood they were transported back again to those districts from which they came,—the polar bear to Greenland, the sloths and armadillos to South America, the kangaroo and other marsupial animals to Australia, the African elephant to the wilds of Africa, whilst the Asiatic elephant, a different species, was left in Asia. In short, to use the emphatic language of Dr. Pye Smith, although the terms in which he expresses himself are perhaps too strong, "All land animals have their geographical regions, to which their constitutional natures are congenial, and many could not live in any other situation. We cannot represent to ourselves the idea of their being brought into one small spot, from the polar regions, the

torrid zone, and all the other climates of Asia, Africa, Europe, America, Australia, and the thousands of islands; their preservation and provision; and the final disposal of them; without bringing up the idea of miracles more stupendous than any that are recorded in Scripture. The great decisive miracle of Christianity, the resurrection of the Lord Jesus, sinks down before it."*

5. As another argument against the universality of the deluge, it has been urged, that the fish and plants could not survive such a catastrophe. It has been considered absurd to assign a place in the ark for the fish, as it was thought that they could easily exist in their native element. But this is a mistake; the fresh-water fish could not possibly exist if the flood covered the whole earth, and so converted all the water into salt;† nor could even most of the salt-water fish withstand the force of such a mighty rush of waters, and which would sweep away their nourishment. By far the greater number of land plants also could not survive a submersion in water for a year; whole species would be extirpated and only a very few would escape destruction.‡ We are therefore reduced, on the hypothe-

* Smith's "*Geology and Scripture*," p. 145, Bohn's Edition.

† A small quantity of salt water will dilute a large quantity of fresh to such a degree as to destroy animal life. A few species of fish can live in brackish water.

‡ "Of the one hundred thousand species of known plants, few would survive submersion for a twelvemonth; nor would the seeds of most of the others fare better than the plants themselves. There are certain hardy seeds that in favourable circumstances maintain their vitality for ages; and there are others, strongly encased in water-tight shells or skins, that have floated across oceans to germinate in distant islands; but such, as every florist knows, is not the general character of seeds; and not until after many unsuccessful attempts, and many expedients had been resorted to, have the more delicate kinds been brought uninjured, even on shipboard, from distant countries to our own. It is not

sis of a universal deluge, to one or other of these three alternatives; either provision was made for the fish and plants in the ark, a thing which its size, not to mention other obvious reasons, would not admit of; or these fish and plants were destroyed by the deluge and afterwards re-created, a mere gratuitous hypothesis contrary to all analogy; or else they were preserved by a series of miracles.

To all these arguments, against the universality of the deluge, it has been replied, that the flood is a miracle and is therefore not to be judged of by natural laws, and that even although the difficulties were ten times greater than they are, yet the power of God could overcome them. Now it is not to be denied that God is able to remove all these difficulties which stand in the way of the universality of the flood by the interposition of miracles; but the question is, Have we scriptural evidence that He has done so? or, if the Scripture is silent on the point, Is it at all probable that such a gigantic system of miracles has been wrought? For consider what this assumption supposes; consider the number, and magnitude, and nature of the miracles which it takes for granted. A miracle could create a sufficient quantity of water, eight times that of the present oceans, and another miracle could destroy it. A miracle could bring together all the different animals from their several habitations, a second miracle could preserve them in existence in a climate where otherwise the most of them would perish, a third miracle could supply them with their appropriate food or sustain them in life without it, and a fourth miracle could transport them back to the

too much to hold that, without special miracle, at least three-fourths of the terrestrial vegetation of the globe would have perished in a universal deluge that covered over the dry land for a year."—MILLER'S "*Testimony of the Rocks*," pp. 338, 339.

same places from which they came. A miracle could keep alive all the fresh-water fish, whilst salt water covered the whole earth, and all the land plants, whilst they were submerged under water for more than a year. Moreover, on this supposition, we must go farther, and affirm that a miracle could lessen the dimensions of the different animals and make them small enough for the ark to contain them. A miracle, if the observations of the most distinguished geologists are correct, could so preserve the summits and flanks of certain volcanic hills, as to prevent their loose materials from being swept away by the diluvial waters. But are we warranted to form these conjectures? Do they not savour of presumption and irreverence? The end which God had in view in the deluge was the destruction of the human race; but if it can be shewn that there is every reason to suppose that man was confined to a limited district, then, to accomplish this end, there was no necessity for a universal deluge. As has been well remarked, "The supposition of such miracles is highly improbable, not to say irreverent. When we are confuting the prodigies of the heathen, we are accustomed to point out their want of an adequate object, their apparent uselessness; and we ought not rashly to expose the miracles of Scripture to a similar reproach."*

Upon a review of the whole subject, we conceive that the discoveries of science go to demonstrate, that the deluge of Noah could not have been universal. All the arguments which have been stated, appear to us to be strong, if not conclusive proofs that the flood did not cover the whole earth. So strong and convincing did the argu-

* KING'S "*Geology and Religion*," p. 127. The same line of argument is there very forcibly stated.

ment appear to Hugh Miller, that he gives his opinion of it in the following terms. "The argument on the general question *is* a cumulative one; and while many of its component portions are of themselves so conclusive, that only supposititious miracle, and not presentable argument, can be arrayed against them, its aggregate force seems wholly irresistible."* The same view of a local deluge has been adopted by Dr. Pye Smith, Dr. Hitchcock, Professor Sedgwick, Dr. King, and all our most accomplished Biblical geologists.†

II. But we now proceed to the second part of our subject, and inquire, What are the scriptural statements on the deluge? Whether they do, or do not, conflict with the scientific view of its limited extent?

We have the scriptural narrative of the deluge in the sixth, seventh, and eighth chapters of the Book of Genesis. We are there informed that the wickedness of men became so great, that God resolved to destroy them. Noah and his family alone found favour in the eyes of the Lord; and accordingly he was divinely commanded to prepare an ark to the saving of his house. "And God said unto Noah, the end of all flesh is come before me: for the earth is filled with violence through them: and, behold, I will destroy them with the earth. Make thee an ark of gopher wood. And, behold, I, even I, do bring a flood of waters upon the earth, to destroy all flesh, wherein is the breath of life, from under heaven: and every thing that is in the earth shall die." Into this ark Noah was enjoined to take

* Miller's "*Testimony of the Rocks*," p. 344.

† Some writers, in order to avoid the difficulties which beset a universal deluge, and who yet are unwilling to abandon the idea of it, suppose that after the deluge there was a new creation of plants and animals, different from those which existed before that catastrophe.

two of every kind of unclean animals, and seven of every kind of clean animals, to keep seed alive upon the earth: and he was also ordered to provide of all fruit that is eaten, both for himself and for them. Seven days after he had entered the ark, we are informed that the flood came,— "the fountains of the great deep were broken up, and the windows of heaven were opened; and the rain was upon the earth forty days and forty nights." So great was the quantity of water, that "all the high hills, that were under the whole heaven, were covered. Fifteen cubits upward did the waters prevail; and the mountains were covered." The effects of the deluge are represented as consisting in a total destruction of life. "And all flesh died that moved upon the earth, both of fowl, and of cattle, and of beast, and of every creeping thing that creepeth upon the earth, and every man. All in whose nostrils was the breath of life, of all that was in the dry land died." After the lapse of a little more than a year, the ark rested on the mountains of Ararat, and Noah and those who were with him in the ark came forth on dry land.

Now we have the most convincing proof that such a deluge, as caused the destruction of the whole human race, did occur. There is scarcely any fact in the Old Testament which is confirmed by such irresistible collateral evidence. It forms part of the traditions of every nation. In all lands of the Old World, in Europe, Asia, and Africa; among the ancient Greeks, Romans, Egyptians, Chaldeans, Phenicians, Germans, and Scythians; in Judea, Persia, China, and the South Sea Islands, there exist traditions of a universal deluge. And the same traditions have been discovered in the New World; the Mexicans, Peruvians, and the savage tribes of America, all possessed their

accounts of this catastrophe.* Every nation has its Noah who was alone saved among the world of the impious. And what is most singular is, that although these traditions are mixed with fables, yet they all have some of the circumstances narrated in the Mosaic account. In most of them we read about the ark; in some about the raven and the dove that were sent from it; in others of the olive branch which the dove brought back; and in others of the different kinds of animals that were taken into the ark; in short, almost the entire scriptural account of the deluge could be collected from the traditions of the various nations. Thus, for example, in the description of Deucalion's flood, as given us by Lucian, we are told that, "in a universal deluge which covered the whole earth, Deucalion alone was preserved, on account of his piety and justice. He built a great ark, and entered into it with his wife and children; and there came to him in pairs, boars, horses, lions, serpents, and all other creatures that lived on the face of the earth; and they sailed together with him in the same ark as long as the water prevailed." And Plutarch tells us, that "a dove was sent out by Deucalion from the ark, which entering into the ark again was a sign of the continuance of the flood, but afterwards flying away was a sign of serene weather."† In short, so remarkable a consistency of such general traditions must by every reasonable man be regarded as demonstrative proof that a deluge did occur co-extensive with the whole human race.

* See a most interesting account of these different traditions, in Miller's "Testimony of the Rocks," lecture seventh. See also Faber's "Horæ Mosaicæ;" Bryant's "Analysis of Ancient Mythology;" and Professor Hitchcock's "Historical and Geological Deluges compared."

† Horne's "*Introduction to the Scriptures*," Vol. i. p. 157. Ninth Edition.

It has been argued that a universal tradition of a deluge is a proof that the deluge also must have been universal in its extent; because traditions exist in every country, therefore, it has been inferred, the deluge must have extended over every country. A very little consideration will prove that this inference is erroneous. If, indeed, every nation had a distinct Noah of its own, then the inference would hold good; but if there were only one Noah, then it is evident that there must also be one centre of tradition. When nations emigrated from the original abode of the human race they would carry their traditions with them, and as these traditions became, in the course of time, confused and corrupted, they would attach their narratives of the deluge to their own particular districts. Such a universal tradition does not prove that the deluge was universal as regards the earth, but merely that it was universal as regards the human race; that all men were swept away by it, and that only Noah and his family survived. It is a strong and irresistible corroboration of the scriptural account of the deluge, as regards the destruction of mankind; but it has no relation whatever to its geographical extent,—whether the waters covered the whole earth, or were only limited to a particular district in western Asia.

Let us, then, direct our attention to the scriptural statements concerning the geographical extent of the deluge. Now, it is at once admitted that the Bible does, at first view, seem to teach the universality of the flood, so that, if it were not for the discoveries of science, this view of the subject would have been in general acquiesced in. We are expressly told that "the waters prevailed exceedingly on the earth; so that all the high hills, that were under the whole heaven, were covered," and that "all flesh

died that moved upon the earth, both of man and beast." What terms, it is asked, can be more universal, and if they are to be interpreted in a limited sense, what certainty can there be in the language of Scripture?

It is to be observed that the term *earth*, as employed in the Old Testament, often denotes merely the land or the locality wherein the writer dwelt. At other times it is employed to signify that portion of the dry land inhabited by man, as the ancients could have no knowledge of what was beyond this. Universal terms are also very frequently employed in Scripture to denote only a very large number.* The scriptural instances of this are very numerous; we merely mention a few, taken at random. Thus it is said, that all "countries came into Egypt to Joseph for to buy corn,"—a statement which, it is evident, can only refer to the countries in the immediate neighbourhood of Egypt; it being impossible that in those days men could journey from the most distant parts of the earth for the purpose of purchasing corn in Egypt. "This day," said God to the Israelites, "will I put the fear of thee upon the nations that are under the whole heaven;" but from the narrative it appears that it is only the Canaanites and the nations in the immediate neighbourhood who are here meant. "The fear of David," we are informed, "went forth into all lands, and the Lord brought the fear of him upon all nations,"—expressions which can only be used in a limited sense, as denoting Egypt and the nations of western Asia. "All the earth," it is said, "sought to Solomon to hear his wisdom,"—an expression which, although

* Dr. Pye Smith has truly observed, "To those who have studied the phraseology of Scripture, there is no rule of interpretation more certain than this, that *universal terms* are often used to signify only a *very large* amount in number or quantity."—"*Scripture and Geology*," p. 268.

apparently universal, can only embrace a comparatively small portion of the earth. And even in the New Testament, there are universal terms which require a similar limitation to be given to their meaning. Thus, in St. Luke's gospel, we are told, that "there went out a decree from Cæsar Augustus, that all the world should be taxed;" which can only refer to the countries belonging to the Roman empire. In the Acts of the Apostles, we are informed, that "there were dwelling in Jerusalem, Jews, devout men, out of every nation under heaven;" yet, in the enumeration which follows, the region is limited to Persia in the east, Italy in the west, Egypt and Arabia in the south, and Pontus or the Black Sea in the north. So also St. Paul, in the epistle to the Colossians, says, that the "gospel was preached to every creature which is under heaven;" a declaration which must necessarily be understood in a limited sense.

But it is said that there are circumstances in the scriptural account of the deluge which prove that the universal terms there employed must be taken in their full extent. It is argued that before the deluge the earth was, in all probability, as populous as it is now, and that if this were the case the flood must have been universal, in order to have destroyed the whole human race. Sixteen hundred years elapsed between the creation and the deluge, which period, especially considering the great age of the antediluvians, it is thought, must have been sufficient to have peopled the whole world. Accordingly, very ingenious calculations have been made as to the population of the antediluvian world. Dr. Thomas Burnet supposes ten thousand millions to be a very moderate estimate.* But

* The calculation by which Dr. Burnet arrives at this extraordinary result, is given us in the 23d page of his "Sacred Theory," vol. i. The

this and other similar calculations proceed on the omission of one very important fact recorded in the sacred narrative. We are informed that "the earth was filled with violence," and that "all flesh had corrupted his way upon the earth." We must, then, take into account the effect of human wickedness in diminishing the population. Palestine may be said to be comparatively a desert, when we contrast the number of its present inhabitants with the number which it contained before the Romans under Titus invaded the country. During the invasion of the northern hordes of barbarians into the Roman empire, the number of inhabitants in Italy was greatly reduced, and that country has never recovered its former population. So also all conquerors have lessened the population of those countries which they have invaded. In the West Indies, the Spaniards in the course of a very few years, completely depopulated thickly inhabited districts;* and the same was the effect of their conquests of the once flourishing empires of Mexico and Peru. The inhabitants of many of the islands in the South Seas are rapidly decreasing in number. The extreme violence of the antediluvians, then, must have put an effectual check to any great increase in their population; and would, perhaps, had not the divine judgment interposed, have terminated, in the course of time, in total extinction.

population of the globe at present is considerably less than a thousand millions; so that, according to Burnet, before the flood it was ten times greater.

* A most interesting and painful account of the cruelties of the Spaniards in the West Indies is given us by Washington Irving in his "Life of Columbus." If the antediluvians were equal to them in wickedness, the population before the flood must have been very small indeed: and yet the Spaniards were not only professing Christians, but many of them religious fanatics.

It is further argued that there are several expressions which prove that the deluge must have been universal. For example we read:—"All the high hills that were under the whole heaven were covered. Fifteen cubits upward did the waters prevail: and the mountains were covered." If, then, the flood covered the high hills, and especially as the lofty Ararat was one of these hills, it must, on the principle of water finding its level, have covered the whole earth. But this objection is founded on an error in physical science. Geology has demonstrated that the changes on the earth's surface do not arise from any change in the ocean, but in the land: the level of the sea has remained for ages nearly the same throughout the globe; it is the land which has changed. If, then, there were, in a portion of western Asia, a subsidence of the land, and if the subsidence continued so that all the high hills of the district were covered with water, it would be no proof whatever that the whole world was similarly submerged under the ocean.* According to appearances, it would seem as if the sea advanced upon the land, and would have been so described by an unscientific observer, whereas in reality it was the land that had sunk.† And it is also to be observed that, in the very district of western Asia, there is a large portion of land, around the Caspian and Dead seas, which is several feet below the level of the

* An example of an extensive submergence of land occurred in 1819 at Cutch in the delta of the Indus: a large tract of land, 2000 square miles in area, was by an earthquake converted into an inland sea.

† When in 1822 a large tract of Chili, about a hundred miles from north to south, and containing an area of about 100,000 square miles, was elevated from two to seven feet above its former level, the natives believed, not that the land had risen, but that the ocean had permanently retreated.

ocean, and whose subsidence has been proved to be of comparatively a recent date.*

But it has been said that such a limitation of the universal terms with which the deluge is described would never have been thought of, had it not been for the discoveries of science. Granting this to be the case, what follows from such an admission? Does not science cast light upon many passages of Scripture, and afford us the key to their true interpretation? Has not the science of astronomy, for example, explained to us several passages which otherwise we had misinterpreted? And if we are to allow astronomy to explain and illustrate Scripture, why should not geology also do the same? If, according to the principles of philology, the passage admits of a particular meaning, although it may not be the most obvious one, yet if science has demonstrated that such a meaning is true, surely there is no violence done to Scripture by its adoption. We do not on this principle render the meaning of Scripture uncertain, by saying that the former interpretations were incorrect, any more than we shake the foundations of science by affirming that the former theories

* In our translation, it is said that the ark rested on the mountains of Ararat. It is now generally agreed upon by biblical scholars that by this is not meant the lofty mountain of that name, but a district of Armenia. The word is so rendered in our translation in 2 Kings xix. 37, and Isa. xxxvii. 38. Josephus says that "the ark rested on the top of a certain mountain in Armenia."

Besides the answer given to the objection in the text, it might be replied, that the water might be miraculously suspended, by attractive influence, over the district where the flood occurred, so that all the high hills were covered, without supposing any subsidence of the land. In either case the miraculous nature of the deluge is asserted; for we have no sympathy whatever with those who attempt to explain away the miracles of the Old Testament by the natural operations of physical causes.

were false. Geology and other kindred sciences enable us to give the proper meaning to the Mosaic narrative of the deluge; they teach that by the term *earth* is meant only the portion of the world inhabited by man, and that by all flesh is meant the animals inhabiting this district; and this limitation of universal terms is perfectly agreeable to the language of Scripture in other places. Science, then, we affirm, does not contradict, but only illustrates the Mosaic narrative.

But it is a mistake to suppose that such an interpretation of the Mosaic narrative would not have been thought of, except for the recent discoveries of science. Nearly a hundred and fifty years before these discoveries were made, and long before geology as a science was known, very eminent divines taught that the deluge was local in its extent. Bishop Stillingfleet, and Poole, the illustrious commentator, both entertained these views. "I cannot see," says Bishop Stillingfleet, "any urgent necessity from the Scripture to assert that the flood did spread over all the surface of the earth. That all mankind, those in the ark excepted, were destroyed by it, is most certain, according to the Scriptures. The flood was universal as to mankind; but from thence follows no necessity at all of asserting the universality of it as to the globe of the earth, unless it be sufficiently proved that the whole earth was peopled before the flood, which I despair of ever seeing proved."* "It is not to be supposed," says Poole, "that the entire globe of the earth was covered with water. Where was the need of overwhelming those regions in which there were no human beings? It would be highly unreasonable to suppose that mankind had so increased, before the deluge, as to have penetrated to all the corners of the earth. It is, indeed, not probable that they had extended

* STILLINGFLEET'S "*Origines Sacræ*," book iii. chap. iv.

themselves beyond the limits of Syria and Mesopotamia. Absurd it would be to affirm that the effects of the punishment inflicted upon men alone, applied to places in which there were no men. If, then, we should entertain the belief that not so much as the hundredth part of the globe was overspread with water, still the deluge would be universal, because the extirpation took effect upon all the part of the world which was inhabited. If we take this ground, the difficulties which some have raised about the deluge fall away as inapplicable and mere cavils; and irreligious persons have no reason left them for doubting the truth of the Holy Scriptures."*

If we adopt the opinion that the deluge was limited in extent, then not only are there no geological facts contrary to it, but strong presumptions in its favour. Geologists have proved that very extensive deluges must have occurred over and over again. It is one of the most recognised facts in their science that a subsidence of the land has frequently taken place, and that lofty mountains have been submerged under the sea. And especially in the geological period immediately before the present, in the drift era, there must have been repeated instances of extensive diluvial action, and some of them at a very modern period. Violent deluges must have swept over large portions of the earth. These are supposed to have been occasioned by the elevation of mountain chains which caused the ocean to sweep over the adjoining lands. Some suppose that these elevations have been slow and gradual; others regard them as sudden. Many of our most distinguished geologists affirm that the drift era may have extended even to modern and historic times; and that some of its last deposits may have been formed since man was created;

* Poole's "*Synopsis on Genesis* vii."

and therefore that there is no natural impossibility or improbability in supposing that a similar cause may have produced the deluge of Noah. This is the opinion of so accomplished and cautious a geologist as Professor Sedgwick, and expressed by him also at the very time when he publicly declared his conviction that the drift, taken as a whole, was not the effect of the deluge. "Though," says he, "we have not yet found the certain traces of any great diluvian catastrophe which we can affirm to be within the human period; we have, at least, shown that paroxysms of internal energy, accompanied by the elevation of mountain chains, and followed by mighty waves desolating whole regions of the earth, were a part of the mechanism of nature. And what has happened, again and again, from the most ancient up to the most modern periods in the natural history of the earth, may have happened once during the few thousand years that man has been living on its surface. We have therefore taken away all anterior incredibility from the fact of a recent deluge; and we have prepared the mind, doubting about the truth of things of which it knows not either the origin or the end, for the adoption of this fact on the weight of historic testimony."* And in his "Geology of the Lake district," he expresses himself in similar terms: "If we have the clearest proofs of great oscillations of sea-level, and have a right to make use of them, while we seek to explain some of the latest phenomena of geology, may we not reasonably suppose, that, within the period of human history, similar oscillations have taken place in those parts of Asia which were the cradle of our race, and may have produced that destruction among the early families of men, which is described in our sacred books, and of which so many tra-

* SEDGWICK'S "*Address to the Geological Society*," 1831, p. 34.

ditions have been brought down to us through all the streams of authentic history?"

It becomes us at all times to follow the truth wherever it conducts, to cultivate a sincere affection for it, and not to be diverted or turned aside from its pursuit. Nor need we be afraid that one truth shall ever contradict another. As Scripture is the infallible word of God, we may rest satisfied that all the discoveries of science and all the reasonings of a sound philosophy will only render homage to its divinity, and serve to confirm and illustrate its contents. And let it be remembered that Scripture has its own evidences,—evidences which for multitude, and variety, and strength, and clearness amount to absolute demonstration,—evidences which no attacks of infidelity have ever been able to shake,—and therefore, whatever may be the discoveries of science, however apparently at variance they may be with the statements of revelation, we may be perfectly sure, that there is not, and there cannot be any real contradiction; the peculiar evidences of revelation remain untouched. Religious men, indeed, have with mistaken zeal attacked scientific discoveries, as if opposed to revealed truths, and in modern times no science has been more frequently the object of these attacks than geology; but it so happens, that probably no science has numbered among its votaries more men, who are eminent alike for their piety and for their scientific attainments, and whose religious convictions, far from being weakened or disturbed, have been increased and confirmed by the illustrations which geology has afforded them of revealed truth, and by the lofty conceptions which it has been the means of fostering within them of the beneficence and wisdom and grandeur of God.

CHAPTER VII.

DIVINE BENEVOLENCE ILLUSTRATED BY GEOLOGY.

THE works of creation reveal to us the existence and some of the attributes of the Supreme Creator. God has impressed His perfections upon the things which He has made. His goodness, especially, is made known to us in nature. "The Lord," says the Psalmist, "is good unto all, and His tender mercies are over all His works." "God," says the apostle, "hath never left Himself without a witness, in that He doeth good." And our blessed Saviour tells us that our heavenly Father is kind even to the unthankful and the evil. Not only revelation, but creation, throughout all its works, proclaims that God is good. The things which God has made, whilst they reveal to us His eternal power and Godhead, at the same time disclose to us His infinite benevolence. This divine attribute is impressed on every thing which we behold. We see it in the glory and grandeur of the sun, in the mild radiance of the moon, in the brilliancy of the fixed stars, in the perpetual revolutions of the seasons, and in the constant succession of day and night. We read it in the verdure which adorns the earth, in the beauty of the flowers, and in the corn which covers our fields. We see it in the happiness of the inferior creation, in the warbling of the birds, in the fluttering of the insects, and in the life and activity and joy which everywhere abound in a sum-

mer's evening. We experience it in the frame and constitution of our bodies, in the faculties and emotions of our souls, in our intercourse with our friends, in the interchange of thought and affection, in the comforts of domestic and social life, and in the peace and safety afforded by the institution of government. But not less clearly is this attribute inscribed upon the rocks. Geology, whilst it reveals to us the grandeur of God, and enlarges our conceptions of His empire as extending through the vast cycles of a past duration, and furnishes us with convincing proofs and striking examples of His almighty power and infinite wisdom, also affords us new displays and bright manifestations of His unbounded benevolence, and proclaims, in language intelligible to all who listen, that God is good.

Dr. Paley, in his masterpiece, the "Natural Theology," discoursing upon the goodness of the Deity, brings forward two most conclusive arguments in proof of it. The first is, that "in a vast plurality of instances in which contrivance is perceived, the design of the contrivance is *beneficial.*" This argument he happily illustrates by a variety of well chosen instances; and, indeed, we have just to open our eyes and look around to see proofs and examples of beneficent contrivance. Although pain and evil exist in the world, yet the original purpose of every thing appears to be eminently beneficent. Nothing can be discovered the chief design of which is to produce pain or disease. "Evil," observes Paley, "no doubt, exists; but is never, that we can perceive, the *object* of contrivance." The original and main design is the production of happiness; evil is a mere incidental effect, but is in no sense whatever the purpose of the contrivance. "Teeth are contrived to eat, not to ache; their aching now and then is incidental to the contrivance, perhaps inseparable from it;

but it is not the object of it. In describing implements of husbandry, you would hardly say of the sickle, that it is made to cut the reaper's hand; though, from the construction of the instrument, and the manner of using it, this mischief often follows. But if you had occasion to describe instruments of torture or execution; this engine, you would say, is to extend the sinews; this to dislocate the joints; this to break the bones; this to scorch the soles of the feet. Here pain and misery are the very objects of the contrivance. Now, nothing of this sort is to be found in the works of nature."

Dr. Paley's second argument is, that "the Deity has superadded *pleasure* to animal sensations, beyond what was necessary for any other purpose, or when the purpose, so far as it was necessary, might have been effected by the operation of pain." The examples of the truth of this observation are innumerable. The world is full of the instances of the Divine liberality. The beauty which is painted on the flowers, the delightful odours which are wafted to us by the summer's breeze, the landscapes which are spread out before us, the agreeable sounds which ever fluctuate in our ears, the pleasantness of the seasons, and the gratification which we find in the exercise of our faculties,—all these are pleasures, superadded beyond what is necessary for the perfect operation of the laws of nature, proofs and manifestations of the goodness of the Lord, refreshing and cheering streams which proceed from the ever-flowing fountain of the Divine benevolence. "O Lord, how manifold are Thy works! in wisdom hast Thou made them all; the earth is full of Thy riches."*

It is necessary, however, that caution be exercised, and

* Paley's "*Natural Theology*," chap. xxvi.—"The goodness of the Deity." The whole chapter is well worthy of most attentive study; the

that more especially when we apply the argument to past geological ages, in asserting what is the main design of any contrivance or object. In the world which now exists, there are abundance of direct proofs of the truth of Dr. Paley's propositions; but in those worlds which have passed away, we may be unable to assert with confidence, what are the chief purposes which God had in view in certain of His works; and therefore it is perhaps pressing the argument too far to assert that the design of certain geological phenomena was wholly or chiefly the good of men. Still, however, although there may be other reasons, yet if the happiness and welfare of men are evident, though it may be incidental effects of these phenomena, there is a strong presumption that there was in their occurrence a prospective provision for the good of man. We cannot, for example, assert that the chief design of the sun or moon is to illuminate the earth, yet we have no doubt that this is one of their uses intended by the Creator. God's works are known unto Him from the beginning, all are comprehended in the great scheme of providence, and all are so arranged as to be a system of mutual adaptations. This world was in a course of preparation for man ages before his existence, and in the bowels of the earth there were designedly stored up and prepared for him materials for his comfort and benefit, the want of which would greatly have impeded his progress in civilisation, and materially impaired his happiness. "I would in this, as in all other cases," observes Dr. Buckland, "be unwilling to press the theory of relation to the human race, so far as to contend that all the great geological phe-

reasoning is admirable, and several passages are of great beauty. We think, however, that Paley has overlooked too much the justice of God in the answers which he gives to the objections against the Divine goodness.

nomena we have been considering were conducted *solely* and *exclusively* with a view to the benefit of man. We may rather count the advantages he derives from them as incidental and residuary consequences; which, although they may not have formed the exclusive object of creation, were all foreseen and comprehended in the plans of the great Architect of that globe, which, in His appointed time, was destined to become the scene of human habitation."*

In this chapter, we propose to apply the arguments of Dr. Paley to geology; to consider the beneficial contrivances and the superadded pleasures which that science discloses: to direct attention to the geological proofs of the Divine benevolence. And in doing this, we shall mention several instances which geology exhibits of the goodness of God, not only as regards the human race, but also as regards the inferior animals.

I. And the first instance, which naturally suggests itself, is the fact, that *vast numbers of animals enjoyed existence in past geological ages.*

Geology carries our thoughts back to the myriads of ages which are past, and shows us this, our world, the habitation of unnumbered creatures, the works of the Supreme Creator. Now the goodness of God is seen in the creation of the inferior animals. Indeed, no other reason for their creation can be assigned than that they should enjoy existence. It is impossible to suppose that God created animals to be miserable, or endowed them with life to render their existence a curse. So far as we can perceive, there is a far larger amount of happiness than of misery among the inferior animals in their natural state. The simple fact of their existence, then, is proof of a positive amount of happiness, and of the Divine benevolence. Now

* Buckland's "*Bridgewater Treatise*," Vol. i. p. 99.

we have every reason to apply this line of argument to the entire series of past creations. Geology thus extends the benevolence of God to the past; it reveals to us His goodness, as being exercised during millions of years before man was formed, in calling innumerable creatures into being, and causing them to rejoice in His benevolence.

In meditating on the goodness of God, we are too apt to restrict its manifestations to the human race, and to forget that it likewise extends to and embraces the inferior animals. They, as well as we, are the objects of the Divine benevolence. The goodness of God is seen in their preservation and in the provisions made for their happiness. He has furnished them with a proper supply of necessary food; He has adapted their forms and organs to their peculiar nourishment; He has superadded pleasure to their animal sensations; He has provided amply for all their wants out of the riches of His liberality; He has implanted within them various instincts and inclinations, to the satisfaction of which He has annexed enjoyment; He has fitted their natures to the elements and climates in which they live; He has clothed them with suitable coverings; He has imparted to them different dispositions and qualities according to their natures; and He has bestowed upon them either weapons for the capture and destruction of their prey, or else means of defence against the attacks of foes. "These all wait upon Thee, that Thou mayest give them their meat in due season. That Thou givest them, they gather; Thou openest thine hand and satisfiest the desire of every living creature." "The pastures are clothed with flocks; the valleys also are covered over with corn, they shout for joy, they also sing." And our blessed Saviour directs our special attention to this care and kindness of God toward the inferior

creation. "Behold the fowls of the air; for they sow not, neither do they reap, nor gather into barns; yet your Heavenly Father feedeth them." "Are not two sparrows sold for a farthing? and one of them shall not fall to the ground without your Father."

Now the argument stands thus:—The same kindness and care, which God now exercises toward the inferior animals, were exercised during the past geological ages. In the fossil organic remains we find as numerous instances of benevolent design and contrivance as in living animals. Each animal then, as now, was provided for by the care of our heavenly Father; each then, as now, had its appropriate food, was endowed with its peculiar instincts, and was adapted to the climate in which it lived; and therefore, we conclude that each then, as now, was an object of the Divine benevolence. It is this extension of the same benevolence, which is now exercised toward the inferior animals, to the immeasurable ages of the past, that constitutes the disclosure of geology. The goodness of God is thus seen in a far vaster number and greater variety of living creatures, and the manifestations of it are thus multiplied and increased indefinitely.

The existence of carnivorous animals is no objection to the goodness of God toward the inferior creation. This system of things in reality increases the happiness of the lower animals. It permits a far larger number to exist and to share in the Divine bounty; it employs the dead bodies of animals as the means of sustaining and affording enjoyment to a vast quantity of other creatures; and as to the fact of death by beasts of prey, this is in general less painful to the inferior animals than death by disease or old age.*

* See this subject fully treated in the fifth chapter of this work—"On the existence of death among the inferior animals before sin."

II. We derive our second proof of Divine benevolence from the *geological agencies of change which operate upon the surface of the earth.* We shall mention only two examples of these geological agencies.

Almost all the changes which have occurred on the surface of the globe have been effected by *igneous and aqueous agencies.* The igneous agency has been the instrument of raising land to a higher level, elevating it may be the bottom of the ocean, and forming all those chains of mountains which are upon the earth. The aqueous agency, on the contrary, has been the instrument of reducing land to a lower level, wearing down mountains by means of streams and rivers, transporting earthy materials, and strewing them along the ocean bed. Fire constitutes the one agency: its effects are seen in the upheavings of the earthquake and in the melted matter which issues from the volcano. These effects, at first sight, appear to be evils; but their influence in elevating the land, and counteracting the degrading effects of the aqueous agency, is eminently beneficial. Water constitutes the other agency: its effects are seen in the transporting power of streams, rivers, and the ocean. It is in itself a great reservoir of life, and contains a far vaster number of inhabitants than the dry land. But especially is the goodness of God seen in the balance which is sustained between these two agencies; they form an equipoise to each other. If the igneous agency were the greater, the land would be all elevated into mountain chains, and the ocean confined in deep chasms; whereas, if the aqueous agency were the greater, the sea would have in the course of ages covered nearly the whole of the earth's surface. But God has set bounds to both: He has said to the violence of the volcano as well as to the billows of the sea, "Hitherto shalt thou

come and no farther;" He weighs the mountains in scales, whilst He measures the waters in the hollow of His hand; and thus, by this nice adjustment of these mighty agencies in nature, He imparts a stability to the world, and derives permanence as the result of a series of changes, and security as the effect of the most awful convulsions.

Another class of agencies on the surface of the earth arise from *disintegration and consolidation.* In this also, we discover the proofs of the Divine benevolence. The dry land is composed partly of soft earthy materials, and partly of hard and compact stones or rocks; now these are the effects of disintegration on the one hand, and of consolidation on the other. By disintegration the rocky materials are pulverised, worn down, and converted into what we commonly call earth. This is done by means of the chemical influence of the atmosphere, and the mechanical influence of water. All the earth, and soil, and loose materials on the surface, are nothing more than rocks ground to powder by the mighty agency of nature. The necessity and utility of this are seen in the formation of soils. If disintegration did not exist, there would be no soils, and consequently no plants could grow upon the earth, and as a farther consequence no animal life could possibly exist; the world would be converted into a frightful desert, an entire mass of rock, unanimated by a single living organism. But, on the other hand, the opposite agency, consolidation, is no less necessary. The loose materials—sand, clay, or gravel, are again consolidated and converted into rock. This is done by pressure at the bottom of the ocean, by the influence of heat, or by some cementing substance. If it were not for this, we would have no stones to build for ourselves habitations. Thus, then, by the combined action of these two antagonistic agencies, the happiness and com-

fort of man are provided for. The mighty hammer of nature breaks the rock in pieces, grounds it into powder, and thus prepares it to sustain animal and vegetable life; whilst, on the other hand, the loose earthy materials are formed into hard rock, and in this compact state are employed by man in adding to his comfort and happiness.

III. A third instance of the goodness of God is seen in *the inclination of the stratified rocks.*

All the stratified rocks are formed by the agency of water in estuary beds or at the bottom of the sea. They were originally deposited in a horizontal position, one layer being placed upon the top of another. They have not however remained in this their original position; but have been elevated by igneous agency, and have thus been inclined to the horizon. They are now found at the earth's surface at different inclinations; some even perpendicular, though in general the angle of inclination is small. The effect of this is eminently beneficial to man. If the stratified rocks had not been inclined, if they had remained in their original horizontal position, the one above the other, they would have been inaccessible. The only way by which they could have been reached would have been by penetrating into the earth; but all the labour of man has seldom been able to penetrate to the depth of half-a-mile. Hence all those valuable materials which are contained in the rocks—sandstone, marble, coal, mineral salt, and the metals, would have been wholly beyond our reach; they would, so far as regards us, have had no existence; and thus we would have been deprived of all those things which constitute the elements of civilisation and comfort. But by the inclination of the strata, the stratified rocks are accessible to a depth of ten miles, and thus all those useful deposits which they contain are within the reach of

human industry, and are bestowed as the reward of human labour. This, to the inattentive observer, insignificant circumstance, is the source of all our mineral wealth ; and when we consider how essential many of these substances are to civilised society, we must regard the inclination of the strata as a striking instance of the goodness of God.

It is owing also to the inclination of the strata, that water is so plentifully diffused over the earth's surface. By this means are mountains and valleys formed, and these give rise to streams and rivers. And, especially, this is the primary cause of wells and springs. The water, being absorbed by the porous strata, is prevented, by means of impervious rocks, from sinking down into the depths of the earth ; and, at a lower level, in consequence of the inclination of the strata, it is again given forth, as a spring or fountain.* Such, also, is the cause of what are called Artesian wells. By boring into the surface of the earth through the inclined strata of impervious rocks, a bed containing water is reached, and the water, on the principle of a fluid finding its level, rises to the surface of the earth, as a perennial fountain. Now, we need not observe how essential water is for the fertility of any portion of the earth. To deprive it of this element would be to convert it into a Sahara desert. But in consequence of the simple fact, that the strata are inclined, water is diffused over nearly all lands ; and if we regard the circulation of the blood in animals, and of the sap in vegetables, as a striking instance of the wisdom of God, so also is this aqueous cir-

* Springs are caused chiefly by the rain water percolating through porous rocks, or through joints and fissures, and then coming to stiff water-tight rocks, as the argillaceous rocks, so that its farther downward progress is prevented ; and when these porous rocks again appear at the surface at a lower level, the water issues forth from them, according to the well-known law that water finds its level.

culation which cheers and refreshes the material earth, and becomes the source of fertility and enjoyment. "He sendeth the springs into the valleys which run among the hills. They give drink to every beast of the field; the wild asses quench their thirst. He watereth the hills from His chambers; the earth is satisfied with the fruit of Thy works."

IV. A fourth geological argument for the Divine benevolence is derived from *those valuable substances which are to be found in the earth's crust.*

Perhaps the most valuable of all the substances dug out of the earth is *coal.* It has been demonstrated that this is almost entirely of vegetable origin; that it is an assemblage of plants which have become mineralised through heat and pressure. The coals which we burn once constituted the trees of a past creation. Millions of years have passed away since these trees existed and spread out their branches into the air. Not a single one of their species now survives upon the surface of the earth; they have all perished, and that whole group of plants has become extinct. The land on which they grew has been submerged, or the trees have been borne away by rivers, and deposited in estuaries or on the ocean bed; and these have been kept for vast ages as in a store house, and they now, in these latter days, constitute the fuel of man. It is marvellous to think, that we are actually burning the trees which grew upon the earth millions of years ago, that the forests of a former world supply us with fuel, and that the relics of a creation long since extinct form our greatest riches, and are the source of our commercial prosperity. "If," observes Dr. Hitchcock, "a created and intelligent being from some other sphere had alighted on this globe, during that remote period when the vegetation now dug out of the coal forma-

tion covered the surface with its gigantic growth, he might have felt as if there was a waste of creative power. Why, he must have inquired, is there such a profusion of vegetable forms, and such a colossal development of individual plants? To what use can such vast forests be applied? But let ages roll by, and that same being revisit our world at the present time. Let him traverse the little island of Britain, and see there fifteen thousand steam-engines moved by coal dug out of the earth, and produced by these same ancient forests. Let him see these engines performing the work of two millions of men, and moving machinery which accomplishes what would require the unaided labours of three or four hundred millions of men, and he could not doubt but such a result was one of the objects of that rank vegetation which covered the earth, ere it was fit for the residence of such natures as now dwell upon it. Let him go to the coal fields of other countries, and especially those of the United States, stretching over a hundred and fifty thousand square miles, containing a quantity absolutely inexhaustible, and already imparting comfort to millions of the inhabitants, and giving life and energy to every variety of manufacture through the almost entire length of the country, and destined to pour out their wealth through all coming time, long after the forests shall all have been levelled; and irresistible must be the conviction upon his mind, that here is a beautiful example of prospective benevolence on the part of the Deity."* "However remote," observes Dr. Buckland, "may have been the periods, at which these materials of future beneficial dispensations were laid up in store, we may fairly assume, that, besides the immediate purposes effected at, or before the time of their deposition in the strata of the

* Hitchcock's "*Religion of Geology*," pp. 178, 179.

earth, an ulterior prospective view to the future uses of man, formed part of the design, with which they were, ages ago, deposited in a manner so admirably adapted to the benefit of the human race."*

But coal is only one of the many valuable materials found in the earth. *Lime*, for instance, also abounds. This substance is almost entirely composed of the coverings or shells of animals; in some kinds of limestone these shells are so small and microscopic that millions of them are required to constitute a very small portion. The use of lime in the improvement of soil, and in cementing together the stones of our houses is universally known. Here, then, is another prospective provision of God; for the animals whose shells constitute limestone, lived ages before man existed. *Sandstone* is another valuable substance. This has been formed by the action of rivers carrying down sand to the sea, where in the course of ages it has been consolidated, and again elevated to form part of the dry land. Thus all our building stones were prepared ere yet man was created. In like manner all the valuable *metals* are found in the earth's crust; they are discovered in veins filling up fissures of rocks. It has been proved that the rocks had originally no such veins; and that the metals were afterwards, and by a slow process, deposited in them. These metals are found in various parts of the earth's crust; and it has been remarked that the most useful, such as iron and lead, are the most common, and found in different kinds of rock; whereas those which might better be spared, and yet are useful as standards of the value of other commodities, are rare, and each is found only in one particular rock.†

* Buckland's "*Bridgewater Treatise*," pp. 537, 538.

† "As for metals," observes Ray, "they are so many ways useful to mankind, and those uses so well known to all, that it would be lost

"And if," as Dr. King justly observes, "benevolent design appears in the formation of coal, and lime, and the metals individually, the illustration becomes cumulative when we view them in conjunction. Coal was prepared in one way; limestone in another; metals in a mode different from both. But after pursuing paths most unconnected and dissimilar, they meet in serving man."*

Our own country, above all other lands, has been blessed with mineral wealth. The different geological formations with their respective deposits, are to be found in different parts of this island. Coal, lime, sandstone, fossil salt, iron, lead, tin, and other valuable substances abound. It is to this, under God, that we owe a great part of our national wealth and prosperity. We are enabled to put into motion the most extensive machinery; to carry on a traffic almost co-extensive with the world; to supply other nations with our goods and the products of our country; and, although geographically a small and insignificant island in a remote part of the world, yet geologically, perhaps the most valuable spot of the globe, we have become the most powerful nation which the world has ever seen, and our colonies and dependencies occupy an extent of country far larger than the Roman empire at the period of its greatest extension.

It may, however, be objected that we are carrying the argument too far. No doubt such valuable materials do exist in the earth's crust—coal, lime, sandstone, and the metals;

labour to say any thing of them. Without the use of these we could have nothing of culture or civility; no tillage or agriculture; no reaping or mowing; no ploughing or digging: no pruning or lopping; no grafting or incision; no mechanical arts or trades; no vessels or utensils of household stuff; no convenient houses or edifices; no shipping or navigation."

* King's "*Geology and Religion*," p. 209, fifth edition.

and, no doubt, they are exceedingly serviceable and advantageous for man; but how do we know that they were formed or deposited with a design to his special benefit? Man found them, and by his ingenuity employed them, but from this we can draw no argument as to their original purpose. Now, in answer to this objection, it is necessary to recall the caution given at the beginning of this chapter. It is true that we cannot positively affirm that the exclusive design of these materials was the benefit of man: although with regard to some, as the metals, it is difficult to imagine any other design; yet, if the evident effect of them is to promote human happiness, we may reasonably infer that there was a prospective provision for man, and that his benefit was one of the objects which God had in view, and that more especially as such is the beneficial effect of a great number of substances. Man is the most exalted being that has appeared upon the earth; he alone is endowed with a reasonable soul; and, his creation and existence being foreseen by God, it is not at all an improbable supposition to imagine, that throughout the past geological ages there was provision made for his happiness. We have many geological facts which go to demonstrate that such was actually the case, and that throughout the vast series of ages there was a preparation going on for the special benefit of man. This is the conclusion which some of the most eminent and cautious geologists and naturalists, uninfluenced by any theological considerations and guided only by the light of science, have arrived at. It is impossible, within the limits of this work, to state the grounds on which they formed this conclusion. We merely quote the words of Agassiz, probably the greatest naturalist alive. "The aim of the Creator in forming the earth, in allowing it to undergo the successive

changes which geology has pointed out, and in creating successively all the different types of animals which have passed away, was to introduce man upon the surface of our globe. Man is the end toward which all the animal creation has tended from the first appearance of the first palæozoic fishes."*

V. A fifth instance of the Divine benevolence, derived from geology, is *the existence of volcanoes.* We mention these phenomena especially, because they are popularly regarded as being purely an effect of the Divine displeasure.

When we confine our views to the disastrous effects of earthquakes and volcanoes, and entirely overlook the beneficial effects resulting from them, we are constrained to regard them as the instruments of punishment, rather than as the proofs of benevolence. We see the terrible effects of earthquakes in the sudden destruction of thousands of human beings. We read in ancient history of an earthquake which destroyed in the city of Antioch a population of upwards of two hundred thousand. In 1692, Port Royal, the capital of Jamaica, with nearly all its inhabitants, was swallowed up or submerged under the sea. In 1755, the great Lisbon earthquake took place; the greater part of the city was destroyed, and in the course of six minutes sixty thousand persons perished. In 1773, the town of Guatimala, the capital of that country, and having a population of eight thousand families, was swallowed up, and every vestige of its former existence entirely obliterated. In 1797, the town of Riohamba in Peru was destroyed, and forty-five thousand persons perished. The effects of volcanoes, although apparently more awful, have not been nearly so destructive; they are not so sudden in

* Quoted from MILLER'S "*Testimony of the Rocks,*" p. 211.

their action as earthquakes, and time is generally afforded to the neighbouring inhabitants to make their escape. In the celebrated eruption of Vesuvius, about the commencement of the Christian era, although three cities, Pompeii, Herculaneum and Stabiæ, were buried by the lava and volcanic ashes, there was not a great destruction of human life, most of the inhabitants having made their escape. In 1759, the mountain of Jorullo in Mexico was elevated by volcanic agency to a height of 1600 feet above the level of the plain, but we do not read that many perished. The most extensive volcanic eruption of which we have any account is that of Skaptar Jokul, a mountain in Iceland, which occurred in 1783; a large tract of ground was converted into a burning plain, twenty villages were destroyed, and nine thousand persons perished.

If we attended only to these terrible effects, we might conclude that earthquakes and volcanoes are the expressions of the Divine displeasure, directed toward a sinful race; and we do not venture to deny that such may be one of the purposes fulfilled by these phenomena. But still, when we consider their nature and cause, we will, at all events, discern goodness as well as severity. There are, in all probability, beneath the earth's crust vast oceans of melted matter, and if there were no vent for the expansive gases and vapours, the whole world would be destroyed. Now it is the upward movement of these confined fires which constitutes the earthquake, and their escape which gives rise to the volcano. It has often been remarked that the eruption of a volcanic vent puts a stop to a series of earthquakes. Thus, then, volcanoes are in reality the safety-valves of the earth by which the confined fires escape.*

* This is a point on which nearly all philosophers are now agreed. It was first adverted to by Strabo, in the beginning of the Christian era.

More than two hundred of these safety-valves are scattered in different portions of the earth's surface; and they are in reality the means of preventing this world from being destroyed in one universal conflagration. If these vents were shut up, if every passage from the interior of the earth to the surface were closed, a universal upheaving and destruction would be the inevitable result,—the earth and all that is therein would be burned up.

Such are some of the proofs which geology affords of the benevolence of God. This science, far from being, as was once supposed, antagonistic to religion, or merely barren of religious inferences, affords, perhaps more than any other science, abundant proofs and manifestations of the perfections of God. As astronomy extends our conceptions of the exercise of these perfections through the immensity of space; so geology shows us their development through the immensity of time. As comparative anatomy teaches us to discern the wisdom of the Deity in the innumerable instances of design in the animal creation; so does geology exhibit to us the same wisdom in the organization of the fossils embedded in the rocks and in the contrivances of past creations. And as we have seen in this chapter, the goodness of God is clearly manifested in the many benevolent provisions which geology discloses. And, especially, there is no science which affords us such direct proofs of the existence and providence of God, seen in His immediate interposition in the creation of the different animals which have successively occupied the earth.

"Since," says he, "the craters of Etna have been opened, which yield a passage to the escape of fire, and since burning masses and water have been ejected, the country near the sea-shore has not been so much shaken as at the time previous to the separation of Sicily from Lower Italy when all communications with the external surface were closed."

Geology demonstrates that there was a time when man and the present race of animals were not, and that nothing but the agency of a supreme Creator can account for their existence. "Shall it any longer then be said," observes Dr. Buckland, "that a science, which unfolds such abundant evidence of the being and attributes of God, can reasonably be viewed in any other light than as the efficient auxiliary and handmaid of religion? Some few there still may be whom timidity, or prejudice, or want of opportunity allow not to examine its evidence; who are alarmed by the novelty, or surprised by the extent and magnitude of the views which geology forces on their attention, and who would rather have kept closed the volume of witness, which has been sealed up for ages beneath the surface of the earth, than impose on the student in natural theology the duty of studying its contents; a duty, in which for lack of experience they may anticipate a hazardous or a laborious task, but which, by those engaged in it, is found to afford a natural and righteous and delightful exercise of their highest faculties, in multiplying the evidences of the existence and attributes and providence of God."*

It becomes us, however, in our reflections on the benevolence of God, not to lose sight of His eternal justice. We must beware of regarding God as a Being who is benevolent at the expense of His other attributes; who is too good to punish the guilty, or who is not moved to righteous indignation on account of sin. Such is not the God whom the Scripture reveals; and such is not the God whom nature makes known. From several of the benevolent contrivances we observe in nature suffering may result as well as happiness. The earthquake and the volcano, espe-

* Buckland's "*Bridgewater Treatise*," pp. 593, 594.

cially, carry destruction with them to thousands. These are not examples of unmixed benevolence. Many instances could also be produced of God's holy indignation against sin, and of the connexion which he has established in Providence between sin and its punishment. The benevolence of God is a benevolence toward a sinful race; it is mercy mingled with judgment.

Indeed in nature there are several difficulties connected with our consideration of the Divine benevolence; some enigmas which man by his own unassisted reason cannot solve. God, as it were, reveals Himself in two different characters, as a God of love and a God of justice. We see these different manifestations often in the same event; the earthquake which destroys its thousands is yet the source of general good. This led the heathen to imagine that there were in reality two gods; the one the source of all that was good, and the other the cause of all that was evil. Revelation, however, has solved the difficulty; it reveals God to us, as a God of infinite benevolence and yet of inflexible justice; and whereas nature disclosed these attributes as apparently in opposition to each other, revelation teaches us that a divine harmony subsists between them. In the great scheme of salvation through a crucified Redeemer, the justice and mercy of God meet together; and from the cross of Christ, God proclaims Himself to us His sinful creatures to be, at one and the same time, the just God and the merciful Father. It is only when we realise the element of moral evil, and contemplate the Divine character as revealed to us in Scripture, that we are enabled to discover, in all its extent and fulness, the benevolence of the great Creator. Why moral evil should exist at all is a profound mystery which has baffled the faculties of men from the beginning, and which may justly be regarded as insolvable; but it is, we have reason to

believe, the very benevolence of God which causes Him to punish the wicked, in order to the promotion and preservation of the happiness of the universe at large; and therefore it is most unwarrantable, whilst we continue in sin and impenitence and in the neglect of the provisions of the gospel, to trust to that benevolence for escape from the punishment which our sins have merited.

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